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January 1 to December 31, 1924.

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Spokane Branch
Office of Blister Rust Control,
618 Realty Building,
Spokane, Washington.

CONTENTS

INTRODUCTION

Blister rust was found for the first time in the West at Vancouver, B. C., in the autumn of 1921. The work of this Office during 1922 consisted largely of scouting for the limits of infection of the disease, and the eradication of the cultivated black currant. During that season it was found that the disease had spread quite generally over the Puget Sound region, and as far south as the Columbia River. A secondary and geographically separate focus of infection was found to exist in eastern British Columbia, from Sicamous and Canoe eastward to Revelstoke and Beaton.

The season of 1923 was notable principally for the spread of infection southward through the dry belt of central British Columbia and through the lake region of eastern British Columbia. Infection on cultivated black currants was found to be generally scattered over the dry belt, and extended as far south as the central part of Okanogan County, Washington. Infection in eastern British Columbia was found to have extended southward to Grand Forks, British Columbia, Danville, Ferry County, Washington, and to Nelson, British Columbia.

It was also found that numerous Ribes were each year infected in the Puget Sound region of western Washington. Their proximity to native white pines made it probable that these pines were becoming infected.

In general, at the end of the 1923 field season, the Idaho white pine belt was directly threatened with invasion from the northwest, through the dry belt, and from the north, through Nelson, British Columbia, and nearby points. Also, the increase of infection in western Washington constituted an ever-increasing menace of infection in western Oregon.

The program for the western work which has been promulgated to meet existent conditions at the beginning of the 1923 season consisted briefly of the following: (1) delay of the rapid spread of the disease by, eradication of the cultivated black currants, and strict enforcement of blister rust quarantines, and (2) development of local control methods suitable to western forest conditions. The spread of the disease toward the Idaho white pine belt during 1923 emphasized the necessity of vigorous prosecution of this general program.

The activities of this Office during the season of 1924 have been conducted in conformity with the 10 year program formulated by the Executive Committee. Cultivated black currant eradication, quarantine enforcement, experimental local control and educational work have been carried on.

Work during the period December 1, 1923 to June 30, 1924 was conducted under the Federal Appropriation of $50,000. for western blister rust control during the fiscal year 1924. An additional $4,500. constituting the Departmental reserve on the entire blister rust appropriation, was secured for use during May and June, 1924, in order to institute field work on a basis commensurate with that after July 1. Work during the period July 1 to December 31, 1924 was conducted under the Federal Appropriation of $125,000 for western blister rust control for the fiscal year 1925. These appropriations

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both carry items for scientific investigation of the disease under western conditions. This work has been conducted by the Office of Forest Pathology, Bureau of Plant Industry, and will be reported upon by that Office.

The two appropriations under which the work covered in this report was conducted were allotted by the Secretary of Agriculture as follows:

Allotment of Funds, Fiscal year 1924.

Project	Appropriation for Period April 1 to June 30, 1923.	Period July 1, 1923 to June 30, 1924.	Total
1. Scientific investigation of the disease by Office of Forest Pathology and establishment of a control demonstration area at Cheekye, British Columbia.	$13,700.00	$7,100.00	$20,800.00
2. Location and eradication of cultivated black currants, nursery inspection, scouting for the disease, and educational work.	11,700.00	17,400.00	29,100.00
3. Control reconnaissance and experimental local control, in the white pine forests of northeastern Washington, northern Idaho, and northwestern Montana.	4,700.00	7,600.00	12,300.00
4. Inspection of nursery shipments for violations of blister rust quarantines in cooperation with Federal Horticultural Board.	7,095.00	7,800.00	14,895.00
5. For general supervision of field work, and miscellaneous expenses of western field office.	3,395.00	8,600.00	11,995.00
Total	$40,590.00	$48,500.00	$89,090.00

Allotment of Funds, Fiscal Year 1925.

Project	Period July 1, 1924 to June 30, 1925.
1. For application of general control measures to delay the spread of the rust including location and eradication of cultivated black currants, blister rust quarantine inspection work, nursery sanitation, etc.	$35,815.00
2. For development of local control practices by testing and improving methods of control reconnaissance, the physical and chemical destruction of Ribes and determining the ecological factors effecting local control	20,603.00
3. For application of local control including control reconnaissance and eradication of Ribes on Federal lands.	33,649.00
4. For field studies and collection of field data on spread of rust, damage to pine, etc.	6,695.00

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5. For scientific investigation of the behavior of the rust under western conditions.	$12,000.00
6. For miscellaneous expenses, including supervision, supplies, clerical assistance, etc.	12,488.00
7. For reserve	3,750.00
Total	$125,000.00

In order to budget the funds for the western work on a more detailed basis, the allotment for the fiscal year 1925 was expanded into a detailed statement of the use to which these funds should be put. As it is hoped to use these projects and subprojects on a permanent basis in the future. The work covered in this report will follow the outline of this detailed allotment, which follows:

PROJECT 1.

FOR APPLICATION OF GENERAL CONTROL MEASURES TO DELAY THE SPREAD OF THE RUST INCLUDING LOCATION AND ERADICATION OF CULTIVATED BLACK CURRANTS, BLISTER RUST QUARANTINE INSPECTION WORK, NURSERY SANITATION, ETC.

This project constitutes the emergency phase of the western blister rust control program. Its purpose is to secure the delay of the spread of the rust, to gain time for the development of local control practices, and to postpone as long as possible damage by the rust to western pine forests.

1.1 Cultivated black currant location and eradication in cooperation with states.

In conformity with the general program, field work was conducted to secure the eradication of cultivated black currants over additional territory in Montana, Idaho, Washington, Oregon and California. In general, a more tensive method of work was adopted than had been used in the past. The work was organized on a county basis, and included a preliminary survey securing all possible information from county officials on type of country, roads, and location of houses. Maps of each county were procured, the location of all houses marked, and themen were instructed to visit each house. At the same time, educational work was conducted in each county , by means of moving pictures, exhibits, and local newspaper articles, which proved to be of great assistance in securing the desired eradications.

While these general methods were established and used in the field, it was necessary to modify them in the several states to conform with variations in working conditions. The State of Idaho has legislation against the cultivated black currant, during the period covered by this report had funds available to assist in the work, and paid compensation for plants destroyed. Oregon has legislation against the cultivated black currant but no funds available for compensation. In Montana and California, altho there are no laws against the cultivated black currant, the eradication work has had the

5. For scientific investigation of the behavior of the rust under western conditions. $12,000.00

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FOR APPLICATION OF GENERAL CONTROL MEASURES TO DELAY THE SPREAD OF THE RUST INCLUDING LOCATION AND ERADICATION OF CULTIVATED BLACK CURRANTS, BLISTER RUST QUARANTINE IN-SPECTION WORK, NURSERY SANITATION, ETC.

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full sympathy and much material assistance from the state departments of agriculture. The eradication work conducted by this Office in Washington has had the assistance of a number of the field employees of the State Department of Agriculture.

1.11 Cultivated black currant eradication in Montana.

All cultivated black currant eradication and educational blister rust work in Montana is carried on by Mr. C. H. Johnson, under terms of the following cooperative agreement:

MEMORANDUM OF UNDERSTANDING BETWEEN THE MONTANA STATE DEPARTMENT OF AGRICULTURE AND THE BUREAU OF PLANT INDUSTRY, UNITED STATES DEPARTMENT OF AGRICULTURE, RELATIVE TO COOPERATIVE WORK ON THE CONTROL OF WHITE PINE BLISTER RUST IN MONTANA.

EFFECTIVE JULY 1st, 1924 to JUNE 30th, 1925.

The object of this memorandum of understanding shall be to facilitate the prompt location and eradication or effective control of white pine blister rust in Montana in view of the threatened destruction of private, state and nationally owned timber throughout the West as a result of the presence of this disease in British Columbia and Washington, and the danger of its further spread by natural dissemination or quarantine violations.

It is agreed that the Montana State Department of Agriculture and the Bureau of Plant Industry shall cooperate to the above ends in accordance with the following plans:

1. The Bureau of Plant Industry shall pay the salaries and expenses of one or more men who shall perform necessary scouting for the disease in Montana. The Montana State Department of Agriculture shall deputize these scouts to enable them to enter and inspect any property but not to destroy plants.

2. In view of the fact that the Montana State Department of Agriculture has no special appropriation for blister rust control, it is understood that when this disease appears in Montana, the Montana State Department of Agriculture agrees immediately to make every effort to secure funds for its eradication from sources available to it, and in the event of failure to secure necessary funds for this purpose, the Montana State Department of Agriculture shall deputize the employees of the Bureau of Plant Industry working in Montana, empowering them to destroy blister rust host plants infected or potentially infected with this disease.

3. The Montana State Department of Agriculture and the Bureau of Plant Industry shall cooperate in inspection for the purpose of aiding in the enforcement of State or Federal blister

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3. The Montana State Department of Agriculture and the Bureau of Plant Industry shall cooperate in inspection for the purpose of aiding in the enforcement of State or Federal blister

rust quarantines now in effect or which may be promulgated. The Bureau of Plant Industry shall pay the salaries and expenses and direct the work of one or more men who shall during the proper season inspect for violations of the Federal blister rust quarantines. These men shall also cooperate with the Montana State Department of Agriculture in enforcing State quarantines. For this purpose they shall receive instructions in methods of procedure from the Montana State Department of Agriculture, and shall be deputized to destroy plants shipped in violation of State quarantines.

4. The Montana State Department of Agriculture and its cooperators shall use their regular employees, so far as their other duties permit, in systematically locating cultivated black currants and infected or potentially infected blister rust host plants; in scouting for the blister rust; in inspecting nurseries for this disease and in enforcing State and Federal blister rust quarantines. Such work will aggregate approximately 100 man days, representing a total expenditure on the part of the Montana State Department of Agriculture and its cooperators of about $ 500.00 for the control of this disease. The expenditures of the Bureau of Plant Industry indicated in previous paragraphs will aggregate approximately $7,000.00 but none of the Federal funds shall be spent in compensation for plants destroyed in control work.

5. All official records showing work performed under this agreement shall be open to inspection of the Montana State Department of Agriculture or the Bureau of Plant Industry on request. All findings of the blister rust made by either the Montana State Department of Agriculture and its cooperators or the Bureau of Plant Industry shall be promptly reported to the other party. All specimens collected or received by the Montana State Department of Agriculture and its cooperators which are suspected to be infected with blister rust shall be submitted to the Bureau of Plant Industry for critical determination. The Bureau of Plant Industry shall give such technical information to the employees of the Montana State Department of Agriculture and its cooperators as will enable them to recognize the several stages of the disease.

6. It is understood that the Bureau of Plant Industry shall be primarily responsible for scouting and location of the blister rust in Montana and for technical information on its control, but that the Federal government has no authority to destroy private or state property and therefore the Montana State Department of Agriculture shall be wholly responsible for the destruction of such pine, currant, and gooseberry plants as may be found necessary in order to control the spread of this disease in Montana, including plants shipped in violation of State and Federal blister rust quarantine regulations.

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7. This memorandum of understanding shall take effect July 1, 1924 and continue in force until June 30, 1925 or until previously terminated by mutual consent of the parties concerned.

SIGNATURES:

Aug.20, 1924	(s.) Chester C. Davis
Date	Commissioner of Agriculture, Montana State Department of Agriculture.
Oct.18,1924	(s.) W. A. Taylor
Date	

Mr. Johnson is headquartered at Missoula, in the office of Mr. W. L. Showell, Chief, Division of Horticulture, State Department of Agriculture, from whom he receives much valuable assistance in planning and carrying out his work. The following report by Mr. Johnson covers all his activities for the period of this report:

Report of Seasons Work in Montana for 1924.

The Blister Rust work was resumed in Montana on May 1st by way of a school campaign conducted as in the past to make known the facts concerning blister rust and to aid in our ever increasing efforts to destroy the cultivated black currants.

The accompanying table shows the results of this work by counties.

TABLE I

County	No. of Teachers Who Received Literature	No. who Reported	No. of Specimens Sent in	Reported Locations of Black Currants
Lewis & Clark	168	60	10	1
Madison	80	26	5	0
Teton	83	22	0	0
Beaverhead	78	32	7	0
Glacier	57	18	3	0
Jefferson	58	24	2	0
Pondera	68	36	4	0
Total	592	218	31	1

The number of teachers replying to our circular letters is quite satisfactory considering the fact that in most high schools the work is usually turned over to the science teachers. In consolidated schools one teacher sometimes makesa report for the entire school.

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Total	552	218	31	1

The number of teachers replying to our circular letters is quite satisfactory considering the fact that in most high schools the work is usually turned over to the science teachers. In consolidated schools one teacher sometimes makes a report for the entire school.

Four men with two machines were engaged in the location and eradication of black currants. The number of bushes found this season shows a marked falling off when compared with the previous seasons record. This can best be explained by the facts that the chief industries in counties just east of the continental divide are mining and grazing and little attempt is made at fruit growing. This does not however, explain the almost total absence of the cultivated black currants because, red and white currants and cultivated gooseberry bushes are quite common. The chief reason for the almost non-existence of black currants is that they are not as hardy as the other species of currants and gooseberries and are not able to withstand the severe winter freezing and summer droughts which they are subjected to in that portion of Montana east of the mountains. If such were not the case black currants would be more numerous.

In my daily quest for information I always asked each farmer if he had or knew of anyone possessing black currants. The answer was almost invariably, "I had some. They did not do well, so I dug them up." Another reason why the black currants are losing prestige is that the younger generation have not developed the same fondness for the fruit as their parents. The medicinal benefits seem to be losing favor and the disagreeable odor which is so often described is another factor working to their disfavor.

The following table shows the status of black currant eradication to November 30, 1924.

TABLE II

County	Eradicated		Not Eradicated		Total		% Plantings
	Plantings	Plants	Plantings	Plants	Plantings	Plants	Eradicated
Missoula	81	524	15	449	96	973	84
Ravalli	99	703	7	164	106	867	93
Flathead	46	205	1	15	47	220	98
Lake	29	160	3	28	32	188	91
Mineral	8	39	-	-	8	39	100
Lincoln	16	121	-	-	16	121	100
Sanders	9	56	-	-	9	56	100
Silver Bow	14	44	3	17	17	61	83
Powell	7	73	-	-	7	73	100
Granite	1	3	-	-	1	3	100
Deer Lodge	1	2	-	-	1	2	100
Lewis & Clark	28	436	3	14	31	450	90
Teton	5	50	-	-	5	50	100
Pondera	1	4	1	2	2	6	50
Madison	11	19	-	-	11	19	100
Beaverhead	3	19	1	2	4	21	75
Glacier	1	3	-	-	1	3	100
Jefferson	3	28	2	133	5	161	60
Total	363	2489	36	824	399	3313	90.2

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Lincoln	16	121	–	–	16	121	100
Sanders	9	56	–	–	9	56	100
Silver Bow	14	44	3	17	17	61	83
Powell	7	73	–	–	7	73	100
Granite	1	3	–	–	1	3	100
Deer Lodge	1	2	–	–	1	2	100
Lewis & Clark	28	436	3	14	31	450	90
Teton	5	50	–	–	5	50	100
Pondera	1	4	1	2	2	6	50
Madison	11	19	–	–	11	19	100
Beaverhead	3	19	1	2	4	21	75
Glacier	1	3	–	–	1	3	100
Jefferson	3	28	2	133	5	161	60
Total	363	2489	36	824	399	3313	90.2

The two reel blister rust film, "A Menace to Western Timber" has proved to be a very popular adjunct in aiding our eradication work, also proving to be of exceptional educational value probably more so than any other plan we have used in bringing our problem before the public.

The following figures give the attendance for the towns in which the blister rust film has been shown.

Town	Attendance
Dillon	775
Sheridan	200
Basin	200
Boulder	175
Helena	1810
E. Helena	210
Conrad	350
Choteau	250
Missoula	1700
Total	5670

Exhibits were placed at the state and several county fairs in western Montana. These displays showed the stages of the blister rust at it appears on Ribes and white pine. Many people who formerly had black currants were attracted by the exhibit and for the first time clearly understood why it was necessary too sacrifice their bushes. A man was continually on the job to explain blister rust, supply general information and distribute bulletins and circulars covering the disease in detail.

It was particularly interesting to notice how familiar the children were with the blister rust. As soon as they saw the sign it seemed to associate what they had previously learned from their teacher about this disease. They seemed to be very keen on the subject and eagerly sought for information.

An experience will further illustrate how well the blister rust has been advertised in Montana. One day I had the occasion to consult a photographer, mechanical engineer and moving picture manager on matters pertaining to an exhibit, three men holding positions in different walks of life. When I mentioned the word blister rust they immediately began to ask me questions and they were presented in such a manner that I knew it was not the first time they had heard of the subject. I was quite astonished, but elated to learn that these men knew something of a subject far removed from their lines of work. I asked each individual where he had ever heard of the blister rust. The replies were, from his children, another through the papers and evidently saw our film, while one party had seen the disease in the eastern part of the United States.

The new charts recently received together with the material I now have available will add to the attractiveness of fairs in the future and having these exhibits in such compact form will enable me to cover more territory. I have recently placed a blister rust exhibit before a class in entomology at the University and have made arrangements to loan this exhibit to the Botany Department to be used for class work.

The two reel blister rust film, "A Menace to Western Timber" has proved to be a very popular adjunct in aiding our eradication work, also proving to be of exceptional educational value probably more so than any other plan we have used in bringing our problem before the public.

The following figures give the attendance for the towns in which the blister rust film has been shown.

Town	Attendance
Dillon	775
Sheridan	200
Basin	200
Boulder	175
Helena	1810
E. Helena	210
Conrad	350
Choteau	250
Missoula	1700
Total	5670

Exhibits were placed at the state and several county fairs in western Montana. These displays showed the stages of the blister rust at it appears on Ribes and white pine. Many people who formerly had black currants were attracted by the exhibit and for the first time clearly understood why it was necessary to sacrifice their bushes. A man was continually on the job to explain blister rust, supply general information and distribute bulletins and circulars covering the disease in detail.

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The following figures give the attendance visiting the blister rust exhibit at the fairs:

Helena (State Fair)	10,000
Missoula (Western Mont. Fair)	4,600
Ravalli (County Fair)	5,100
Total	19,700

During the months of October and November some scouting was done in northwestern Montana and along the Canadian border. Considerable scouting was done on the wild species of currants and gooseberries along the Kootenai, Stillwater, Flathead, Clarksfork, Thompson and Missoula river.

A total of 3815 G. setosa, 1609 R. americana and 900 R. petiolare, 680 cultivated gooseberry bushes were inspected.

1.12 Cultivated black currant eradication in Idaho.

Cultivated black currant eradication in Idaho was conducted under the immediate supervision of Dr. H. Schmitz, School of Forestry, University of Idaho, Moscow, Idaho. Dr. Schmitz's report to this Office on the work of the past year, including the cooperative agreement under which the work was done, is given below:

Report of Work Done in the State of Idaho During the Field Season of 1924 in Connection with the Cultivated Black Currant Eradication.

As in past years, cultivated black currant eradication, scouting for the disease and educational work was carried on in Idaho under the terms of the following tentative agreement, between several cooperating agencies:-

MEMORANDUM OF UNDERSTANDING BETWEEN THE IDAHO STATE DEPARTMENT OF AGRICULTURE, THE UNIVERSITY OF IDAHO, THE STATE BOARD OF LAND COMMISSIONERS, THE NORTH IDAHO FORESTRY ASSOCIATION, THE POTLATCH TIMBER PROTECTIVE ASSOCIATION, THE CLEARWATER TIMBER PROTECTIVE ASSOCIATION, THE COEUR D'ALENE TIMBER PROTECTIVE ASSOCIATION, THE PEND OREILLE TIMBER PROTECTIVE ASSOCIATION, THE PRIEST LAKE TIMBER PROTECTIVE ASSOCIATION AND THE BUREAU OF PLANT INDUSTRY OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, RELATIVE TO COOPERATIVE WORK ON THE CONTROL OF WHITE PINE BLISTER RUST IN IDAHO.

EFFECTIVE MAY1, 1924 to JUNE 30, 1925.

The object of this memorandum of understanding shall be to facilitate the prompt location and eradication and effective control of white pine blister rust in Idaho, in view of the threatened destruction of private, state and nationally owned timber throughout the West as a result of the presence of this disease in British Columbia and Washington, and the danger of its further spread by natural dissemination or quarantine violations.

The following figures give the attendance visiting the blister rust exhibit at the fairs:

Helena (State Fair)		10,000
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A total of 3815 G. setosa, 1605 R. americana and 900 R. petiolare, 650 cultivated gooseberry bushes were inspected.

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The object of this memorandum of understanding shall be to facilitate the prompt location and eradication and effective control of white pine blister rust in Idaho, in view of the threatened destruction of private, state and nationally owned timber throughout the West as a result of the presence of this disease in British Columbia and Washington, and the danger of its further spread by natural dissemination or quarantine violations.

It is agreed that the Idaho State Department of Agriculture, the University of Idaho, the State Board of Land Commissioners, the North Idaho Forestry Association, the Potlatch Timber Protective Association, the Clearwater Timber Protective Association, the Coeur d'Alene Timber Protective Association, the Pend Oreille Timber Protective Association and the Priest Lake Timber Protective Association, parties of the first part, and the Bureau of Plant Industry, United States Department of Agriculture, party of the second part, shall cooperate to the above ends in accordance with the following plan:

1. The Idaho State Department of Agriculture and the Bureau of Plant Industry, U. S. Department of Agriculture, shall cooperate in inspection for the purpose of aiding in the enforcement of state and federal blister rust quarantines now in effect or which may be promulgated. The Bureau of Plant Industry, U. S. Department of Agriculture, shall pay the salaries and expenses and direct the work of one or more men who shall, during the proper season, inspect plant shipments for blister rust infection and shall report to the proper authorities all violations of blister rust quarantines as found. For this purpose they will receive instructions in methods of procedure from the Idaho State Department of Agriculture and shall be deputized to destroy plants shipped in violation of State quarantines.

2. The Bureau of Plant Industry, U. S. Department of Agriculture, and the Idaho State Department of Agriculture shall cooperate for the field season of 1924 in the paying of the salaries and expenses of six men as scouts who shall do the necessary scouting for the disease and the locating of cultivated black currants in Idaho.

3. The Idaho State Department of Agriculture agrees to deputize the scouts mentioned in Section 2 and will invest them with the necessary authority to destroy cultivated black currants as provided in Chapter No. 70, Idaho Session Laws of 1923. Furthermore, the Idaho State Department of Agriculture agrees to reimburse such owners of cultivated black currants from monies provided for this purpose. The Idaho State Department of Agriculture also agrees to pay the salaries and expenses of the scouts mentioned in Section 2 for the period May 15th to June 30th, 1924. Furthermore, the Idaho State Department of Agriculture agrees to pay the cost necessary for stenographic help for the field season of 1924, and still further the Idaho State Department of Agriculture agrees to furnish three Ford touring cars and to maintain them during the period of May 15 to June 30, 1924. After June 30, 1924, the State Department of Agriculture agrees to rent said cars for a consideration of $50.00 per car per month to the Bureau of Plant Industry, U. S. Department of Agriculture, until the completion of the field work on white pine blister rust control for the year 1924. The Idaho State Department of Agriculture agreeing to pay all proper costs of maintenance of such cars except charges for gasoline, oil and storage, which will be paid by the Bureau of Plant Industry, U. S. Department of Agriculture. The Idaho State Department of Agriculture further agrees to pay the cost of printing such placards, posters or cards as

It is agreed that the Idaho State Department of Agriculture, the University of Idaho, the State Board of Land Commissioners, the North Idaho Forestry Association, the Potlatch Timber Protective Association, the Clearwater Timber Protective Association, the Coeur d'Alene Timber Protective Association, the Pend Oreille Timber Protective Association and the Priest Lake Timber Protective Association, parties of the first part, and the Bureau of Plant Industry, United States Department of Agriculture, party of the second part, shall cooperate to the above ends in accordance with the following plan:

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may be necessary in order to facilitate the work. The above work and cooperation will aggregate a total expenditure by the Idaho State Department of Agriculture of approximately $4,200 for the control of this disease for the period covered by this agreement.

4. The Idaho State Department of Agriculture will use its regular employees, so far as their other duties permit, in systematically locating cultivated black currants and infected or potentially infected blister rust host plants; in scouting for the white pine blister rust; in inspecting nurseries for this disease and enforcing State and Federal blister rust quarantines.

5. The School of Forestry, University of Idaho, still recognizing the fact that white pine blister rust constitutes one of the most serious menaces to the future productive value of state, nationally, and privately owned timber lands, and that in order that the industry which it represents may be perpetuated, considers the question of the control of white pine blister rust as one of its major activities. The School of Forestry, University of Idaho, therefore agrees to detail Dr. Henry Schmitz to this work throughout the coming field season and to allow him sufficient time during the remainder of this year to supervise the work in general. The School of Forestry, University of Idaho, also agrees to furnish the necessary office space and equipment in its regular quarters for the proper carrying out of this work. The U. S. Bureau of Plant Industry shall take up all field expenses including transportation costs of Dr. Henry Schmitz while actually engaged with supervision of this work. It is understood that he will spend three months, entire time and will after September 15, supervise the work in a general way and when completed shall provide such reports, plans and details as may be called for by the Idaho State Department of Agriculture and by the Bureau of Plant Industry, U. S. Department of Agriculture. Furthermore, the School of Forestry, University of Idaho, in accordance with the recommendations made at the Portland Conference (1922) agrees to continue a study on the rate of growth of the western white pine remaining on areas after logging. The results obtained from this study during the field season of 1923 show a marked increase in the rate of growth of immature western white pine remaining after logging. It is hoped that the results of the study will eventually indicate the possibility of incurring an expenditure for the protection of second growth western white pine against white pine blister rust. Mr. Harry I. Nettleton, and Mr. C. W. Watson with one assistant, will be engaged for three months on this work during the coming field season and it is planned to carry on this work for a sufficient number of years so that reliable data may be obtained. The work here outlined will aggregate a total expenditure on the part of the School of Forestry, University of Idaho, of approximately $3,050 for the control and study of this disease for the period covered by this agreement.

6. The Department of Plant Pathology of the University of Idaho Agricultural Experiment Station agrees to esxamine all specimens sus-

may be necessary in order to facilitate the work. The above work and cooperation will aggregate a total expenditure by the Idaho State Department of Agriculture of approximately $4,200 for the control of this disease for the period covered by this agreement.

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6. The Department of Plant Pathology of the University of Idaho Agricultural Experiment Station agrees to examine all specimens sub-

pected of being infected with the white pine blister rust when sent in by the field scouts and others, to keep the necessary records of such collections. It is also agreed that all specimens which are suspected of being infected with the blister rust shall be submitted to the U. S. Bureau of Plant Industry for final determination. Such work will aggregate a total expenditure on the part of the Department of Plant Pathology of the University of Idaho Agricultural Experiment Station of approximately $300 for the control of this disease for the period covered by this agreement.

7. The Extension Division of the University of Idaho College of Agriculture shall use its regular employees, in so far as their other duties may permit, in locating cultivated black currants and other infected or potentially infected blister rust host plants, and in giving publicity to the campaign to eradicate black currants and to other means for preventing the introduction and spread of white pine blister rust in Idaho.

8. The North Idaho Forestry Association, the Potlatch Timber Protective Association, the Clearwater Timber Protective Association, the Coeur d'Alene Timber Protective Association, and the Pend Oreille Timber Protective Association and the Priest Lake Timber Protective Association, shall use their regular employees and the employees of their constituent timber protective associations, in so far as their other duties will permit, in systematically locating cultivated black currants and the scouting for the blister rust, and in locating infected or potentially infected host plants. Such work will aggregate a total expenditure on the part of the North Idaho Forestry Association and its constituent timber protective associations of approximately $11,500 for the control of this disease for the period of timeer covered by this agreement.

9. The U. S. Bureau of Plant Industry shall take up the salaries and expenses of the scouts mentioned in Section 2, after June 30, 1924. Furthermore, the U. S. Bureau of Plant Industry agrees to take up the expenses of Dr. Henry Schmitz for the entire field season. Still further the U. S. Bureau of Plant Industry agrees to pay rental for the three Ford touring cars after June 30, 1924, on the basis as outlined in Section 3. The U. S. Bureau of Plant Industry also agrees to furnish the scouts with exhibit material and blister rust literature to be distributed in connection with the scouting work. The expenditures of the U. S. Bureau of Plant Industry indicated in this and previous paragraphs will aggregate approximately $7,000. Any expenditures by the Bureau of Plant Industry shall be made according to the fiscal regulations of the United States Department of Agriculture.

10. The State Board of Land Commissioners shall use their regular employees, so far as their other duties permit, in systematically locating cultivated black currants and infected blister rust host plants and in scouting for white pine blister rust.

11. All official records of the work performed under this agreement shall be open to inspection by any or all parties to this agreement. All

pected of being infected with the white pine blister rust when sent in by the field scouts and others, to keep the necessary records of such collections. It is also agreed that all specimens which are suspected of being infected with the blister rust shall be submitted to the U. S. Bureau of Plant Industry for final determination. Such work will aggregate a total expenditure on the part of the Department of Plant Pathology of the University of Idaho Agricultural Experiment Station of approximately $300 for the control of this disease for the period covered by this agreement.

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10. The State Board of Land Commissioners shall use their regular employees, so far as their other duties permit, in systematically locating cultivated black currants and infected blister rust host plants and in scouting for white pine blister rust.

11. All official records of the work performed under this agreement shall be open to inspection by any or all parties to this agreement. All

findings of the blister rust made by any parties to this agreement shall be promptly reported to all other parties to this agreement. All specimens collected by any party to this agreement, which are suspected to be infected with blister rust shall be submitted to the Department of Plant Pathology, University of Idaho, which will in turn forward them to the U. S. Bureau of Plant Industry for final determination. The U.S. Bureau of Plant Industry shall give such technical information to the employees of the parties to this agreement as will enable them to recognize the several stages of this disease.

12. It is understood that the Bureau of Plant Industry, U. S. Department of Agriculture, shall be primarily responsible for scouting and locating the blister rust in Idaho and for furnishing technical information on its control, but that the Federal government has no authority to destroy private or state property and therefore that the Idaho State Department of Agriculture shall be wholly responsible for destroying such pines, currant and gooseberry plants as may be found necessary in order to control the spread of this disease in Idaho, including plants shipped in violation of State and Federal blister rust quarantines and regulations.

13. This memorandum of understanding shall take effect May 1, 1924, and continue in force until June 30, 1925, or until previously terminated by mutual consent of the parties to this agreement. This memorandum of understanding will supersede any other such memorandum in existence between the agreeing parties.

Date	Signatures	Estimated Value of Cooperative Work
May 1, 1924	M. A. Means Commissioner, Idaho Department of Agriculture.	
May 1, 1924	M. L. Dean Director, Bureau of Plant Industry, Idaho Department of Agriculture.	$4,200.00
May 1, 1924	I. H. Nash State Land Commissioner	
May 1, 1924	F. G. Miller Dean, School of Forestry, University of Idaho.	3,050.00
May 1, 1924	E. J. Iddings Director, Agricultural Experiment Station, University of Idaho, and Director of Extension.	300.00
May 1, 1924	Chas. W. Hungerford Pathologist, Agricultural Experiment Station, University of Idaho.	

findings of the blister rust made by any parties to this agreement shall be promptly reported to all other parties to this agreement. All specimens collected by any party to this agreement, which are suspected to be infected with blister rust shall be submitted to the Department of Plant Pathology, University of Idaho, which will in turn forward them to the U. S. Bureau of Plant Industry for final determination. The U.S. Bureau of Plant Industry shall give such technical information to the employees of the parties to this agreement as will enable them to recognize the several stages of this disease.

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May 1, 1924	E. J. Iddings Director, Agricultural Experiment Station, University of Idaho, and Director of Extension.	300.00
May 1, 1924	Chas. W. Hungerford Pathologist, Agricultural Experiment Station, University of Idaho.	

May 1, 1924	A. W. Laird President, North Idaho Forestry Association.	
May 1, 1924	W. D. Humiston Secretary, Potlatch Timber Protective Association.	
May 1, 1924	T. J. Humbird President, Clearwater Timber Protective Association.	$11,500.00
May 1, 1924	B. H. Hornby President, Pend Oreille Timber Protective Association.	
May 1, 1924	J. P. McGoldrick President, Coeur d'Alene Timber Protective Association.	
May 1, 1924	Ben. E. Bush President, Priest River Timber Protective Association.	
May 1, 1924	W. A. Taylor Chief, Bureau of Plant Industry, U. S. Department of Agriculture.	7,000.00
	Total	$26,050.00

The work for the season outlined and approved by the Executive Committee for Idaho in consultation with the Western Office of White Pine Blister Rust Control included the scouting for the disease and the eradication of cultivated black currant bushes in the following counties:

Adams	Lemhi	Clark	Idaho (northern portion covered in 1923)
Washington	Gem	Fremont	
Valley	Boise	Butte	

In addition it was agreed that any time remaining after completing the work in the counties just listed be spent in a careful recheck of Boundary and Bonner Counties.

Since the work in the central Idaho counties required less time than anticipated, time was also available to check Lewis, Nezperce and the northern part of Idaho Counties.

The following tabulation gives the results of the cultivated black currant eradication program in Idaho during the past season:

May 1, 1924	A. W. Laird President, North Idaho Forestry Association.	
May 1, 1924	W. D. Humiston Secretary, Potlatch Timber Protective Association.	
May 1, 1924	T. J. Humbird President, Clearwater Timber Protective Association.	$11,500.00
May 1, 1924	B. H. Hornby President, Pend Oreille Timber Protective Association.	
May 1, 1924	J. P. McGoldrick President, Coeur d'Alene Timber Protective Association.	
May 1, 1924	Ben. E. Bush President, Priest River Timber Protective Association.	
May 1, 1924	W. A. Taylor Chief, Bureau of Plant Industry, U. S. Department of Agriculture.	7,000.00
	Total	$36,050.00

The work for the season outlined and approved by the Executive Committee for Idaho in consultation with the Western Office of White Pine Blister Rust Control included the scouting for the disease and the eradication of cultivated black currant bushes in the following counties:

Adams	Lemhi	Clark	Idaho (northern portion covered in 1923)
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Since the work in the central Idaho counties required less time than anticipated, time was also available to check Lewis, Nezperce and the northern part of Idaho Counties.

The following tabulation gives the results of the cultivated black currant eradication program in Idaho during the past season:

TABLE III

Status of Cultivated Black Currant Eradication Work in Idaho, November 1, 1924.

County	Eradicated		Not Eradicated		Total	
	Plantings	Plants	Plantings	Plants	Plantings	Plants
Adams	1	4			1	4
Boise	none	none			none	none
Butte	none	none			none	none
Clark	1	2			1	2
Custer	none	none			none	none
Fremont	245	2222	# 1	# 12	246	2234
Gem	2	28			2	28
Idaho	21	75			21	75
Lemhi	14	68			14	68
Valley	2	2			2	2
Washington	5	20			5	20
Lewis	1	1			1	1
NezPerce	1	1			1	1
Bonner	22	56			22	56
Boundary	11	70			11	70
Total	326	2549	1	12	327	2561

#This paticular planting is located practically on the Wyoming line. The farm on which it exists is many miles from any tree. Mr. Wilson, the owner, is an intelligent progressive individual, but absolutely refuses to permit the destruction of his bushes until the black currant law has been tested in an actual case.

It is interesting to note that a total of 34 plantings comprising 126 bushes were located in the recheck of Bonner and Boundary Counties. The black currant eradication work was carried on more or less along the general plan formulated last winter. The plan referred to had to be modified somewhat to meet local conditions, but the underlying thought - thoroughness - was always adhered to. The fact that 34 plantings were found in Bonner and Boundary Counties indicates in my mind, two things, namely; (1) that we have at last developed a satisfactory method for scouting for black currants, and (2) that it will be necessary to check Latah, Benewah, Shoshone, Kootenai and Clearwater Counties.

Compensation for Destroyed Black Currant Bushes.

The total amount paid by the State Department of Agriculture to reimburse owners of cultivated black currants approximates $467.85, or an average of about 18½ cents per bush.

I am thoroughly convinced that reimbursing the owner for his bushes is fundamentally sound business and that in the long run it will turn out to be a good investment.

TABLE III

Status of Cultivated Black Currant Eradication Work in Idaho, November 1, 1924.

County	Eradicated		Not Eradicated		Total	
	Plantings	Plants	Plantings	Plants	Plantings	Plants
Adams	1	4			1	4
Boise	none	none			none	none
Butte	none	none			none	none
Clark	1	2			1	2
Custer	none	none			none	none
Fremont	245	2222	1#	12	246	2234
Gem	2	28			2	28
Idaho	21	75			21	75
Lemhi	14	68			14	68
Valley	2	2			2	2
Washington	5	20			5	20
Lewis	1	1			1	1
NezPerce	1	1			1	1
Bonner	22	56			22	56
Boundary	11	70			11	70
Total	326	2549	1	12	327	2561

#This particular planting is located practically on the Wyoming line. The farm on which it exists is many miles from any tree. Mr. Wilson, the owner, is an intelligent progressive individual, but absolutely refuses to permit the destruction of his bushes until the black current law has been tested in an actual case.

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The total amount paid by the State Department of Agriculture to reimburse owners of cultivated black currants approximates $467.05, or an average of about 18½ cents per bush.

I am thoroughly convinced that reimbursing the owner for his bushes is fundamentally sound business and that in the long run it will turn out to be a good investment.

School Campaign

During the early spring a school campaign was carried on in the public schools of all the counties of central Idaho. The following tabulation gives the results of this campaign:

TABLE IV

County	Number of Teachers Sent Material	Number of Replies	Number Reporting Currants
Butte	30	3	0
Lemhi	48	9	1
Boise	23	6	0
Idaho	127	27	3
Washington	95	11	3
Payette	67	6	2
Valley	40	9	0
Adams	42	4	1
Gem	72	14	4
Fremont	98	8	2
Custer	38	11	2
Clark	22	4	0
Total	702	112	18

Replies - Location Unknown - 6

The number of replies received is a little discouraging but can probably be accounted for by the fact that the currants were not yet in leaf at the time the program was carried on. In every case where leaves were sent in with the report of "black currants found", the leaves proved to be <u>R. aureum</u>.

In my opinion, school campaigns as a means of locating cultivated black currants in Idaho, are a failure, primarily on account of the fact that in many parts of the state the schools close before the vegetation leafs out in the spring.

As a means of publicity, school campaigns of some sort are of inestimable value and many personal experiences during the past year substantiated this belief.

1.13 Cultivated Black Currant Eradication in Washington.

Cultivated black currant eradication was conducted in Washington under the direct supervision of the Spokane office. No cooperative agreement was drawn up between the Bureau of Plant Industry and the Washington

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State Department of Agriculture, to cover this work. The Field Assistants employed by this Office worked independently of any state agency, securing the eradication of cultivated black currants by direct contact and cooperation with the owners of the bushes. When the consent of an owner was obtained to have his bushes removed, his signature was secured to a release slip, the form of which is as follows:

> I hereby give to the United States Department of Agriculture, through its authorized agents, ________ cultivated black currant bushes, in order that they may be destroyed. The gift of these plants is made willingly in the interests of public welfare in order that the western white pine forests may be protected.
>
> Date ________________
>
> Signed ____________________
>
> Address ____________________

Prior to the 1924 field season, cultivated black currant eradication had been conducted in Washington in the following areas;

Western Washington - counties west of the summit of the Cascades.
Eastern Washington - Ferry, Stevens, Pend Oreille and Spokane Counties.

The work during the 1924 season was planned to extend the area free of cultivated black currants along the Canadian border, and also along the Washington Idaho state line, in order to delay the spread of the rust into this country from British Columbia, and to further protect the large areas of commercial and young white pine in northern Idaho.

During the field season, 6 men with 3 autos were in the field. The work was started in the extreme southeastern corner of Washington, and progressed in a north and northwest direction. Columbia, Garfield and Asotin Counties were entirely completed, on an intensive basis which should preclude the necessity of further work there. Whitman County was about half done, it being left incomplete in order to have the men working in Okanogan County at the season most favorable to finding the rust if present. This latter county was also about half completed.

The more intensive working method, as outlined on page _____, was thoroughly put into effect in eastern Washington during the past summer. The general effect of such a method may be stated as assuring accuracy and and thoroughness, but at the expense of speed. It is considered, however, as being superior to the older, more extensive methods, in that the ground which is once covered will not need to be reworked. In other words, its value will be more apparent the second and third year than the first.

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Table V, given below, shows the number of cultivated black currant plants and plantings eradicated in eastern Washington during the past summer, including some clean-up in the northeastern counties:

TABLE V

Results of Cultivated Black Currant Eradication, Washington.

County	Plantings Eradicated	Plants Eradicated
Stevens	6	29
Ferry	3	34
Pend Oreille	8	31
Spokane	20	107
Okanogan	24	258
Whitman	46	485
Columbia	4	8
Garfield	2	3
Asotin	15	71
Total	128	1026

1.14 Cultivated Black Currant Eradication in Oregon

Cultivated black currant eradication in Oregon was conducted under the terms of the following cooperative Agreement between the Oregon State Board of Horticultura, the Oregon State Board of Forestry, the Oregon Agricultural College, and the Bureau of Plant Industry:

MEMORANDUM OF UNDERSTANDING BETWEEN THE OREGON STATE BOARD OF HORTICULTURE, THE OREGON STATE BOARD OF FORESTRY, THE OREGON AGRICULTURAL COLLEGE AND THE BUREAU OF PLANT INDUSTRY, UNITED STATES DEPARTMENT OF AGRICULTURE RELATIVE TO COOPERATIVE WORK ON THE CONTROL OF WHITE PINE BLISTER RUST IN OREGON.

EFFECTIVE JULY 1, 1924 to JUNE 30, 1925.

The object of this memorandum of understanding shall be to facilitate the prompt location and eradication or effective control of white pine blister rust in Oregon in view of the threatened destruction of private, state, and nationally owned timber throughout the West as a result of the presence of this disease in British Columbia and Washington, and the danger of its further spread by natural dissemination or quarantine violations.

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It is agreed that the Oregon State Board of Horticulture, the Oregon State Board of Forestry, the Oregon Agricultural College, and the Bureau of Plant Industry shall cooperate to the above ends in accordance with the following plan:

1. The Bureau of Plant Industry shall pay the salaries and expenses of one or more men who shall perform necessary scouting for the disease in Oregon. The Oregon State Board of Horticulture shall deputize these scouts to enable them to enter and inspect any property.

2. In view of the fact that the Oregon State Board of Horticulture has no special appropriation for blister rust control, the Bureau of Plant Industry shall pay the salaries and expenses (in accordance with the fiscal regulations of the United States Department of Agriculture) of one or more men who shall be deputized by and work under the authority and direction of the Oregon State Board of Horticulture to locate and secure the general destruction of cultivated black currant plants in Oregon. These men shall also destroy host plants diseased with or exposed to infection from white pine blister rust, as directed by the Oregon State Board of Horticulture.

3. The Oregon State Board of Horticulture and the Bureau of Plant Industry shall cooperate in inspection for the purpose of aiding in the enforcement of State and Federal blister rust quarantines now in effect or which may be promulgated. The Bureau of Plant Industry shall pay the salaries and expenses and direct the work of one or more men who shall during the proper season inspect for violations of the Federal blister rust quarantines in the State of Oregon. These men shall also cooperate with the Oregon State Board of Horticulture in enforcing State quarantines. For this purpose they shall receive instructions in methods of procedure from the Oregon State Board of Horticulture and shall be deputized to destroy plants shipped in violation of State quarantines.

4. The Oregon State Board of Horticulture and its cooperators shall use their regular employees, so far as their other duties permit, in systematically locating and destroying cultivated black currants and infected or potentially infected blister rust host plants; in inspecting nurseries for this disease and in enforcing State and Federal blister rust quarantines. Such work will aggregate approximately 2,650 man days, representing a total expenditure on the part of the Oregon State Board of Horticulture and its cooperators of about $9,275.00 for the control of this disease. The expenditures of the Bureau of Plant Industry indicated in previous paragraphs will aggregate approximately $6,000.00 but none of the Federal funds shall be spent in compensation for plants destroyed in control work.

5. The Oregon State Board of Forestry shall use its regular employees, so far as their other duties permit, in systematically locating cultivated black currants and in scouting for the

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5. The Oregon State Board of Forestry shall use its regular employees, so far as their other duties permit, in systematically locating cultivated black currants and in scouting for the

blister rust on its wild and cultivated host plants. Such work will aggregate a total expenditure by the Oregon State Board of Forestry of approximately $5,000.00 for the control of this disease during the period covered by this agreement.

6. The Oregon Agricultural College agrees to examine all specimens suspected of being infected with white pine blister rust when sent in by the field scouts and others, and to keep the necessary records of such collections. It is also agreed that all specimens which are suspected of being infected with the blister rust shall be submitted to the Bureau of Plant Industry for final determination. It is further agreed that the Oregon Agricultural College shall furnish Mr. L. N. Goodding, the representative of the Bureau of Plant Industry engaged in blister rust control work in Oregon such office space as is necessary for properly conducting his work. Such work will aggregate an expenditure on the part of the Oregon Agricultural College of approximately $1,000.00 for the control of this disease, during the period covered by this agreement.

7. All official records showing work performed under this agreement shall be open to inspection of the Oregon State Board of Horticulture, the Oregon State Board of Forestry, the Oregon Agricultural College or the Bureau of Plant Industry on request. All findings of the blister rust made by either the Oregon State Board of Horticulture, the Oregon State Board of Forestry, the Oregon Agricultural College or the Bureau of Plant Industry shall be promptly reported to the other parties. All specimens collected or received by the Oregon State Board of Horticulture, the Oregon State Board of Forestry and their cooperators which are suspected to be infected with blister rust shall be submitted to the Oregon Agricultural College for critical determination. The Bureau of Plant Industry shall give such technical information to the employees of the Oregon State Board of Horticulture or the Oregon State Board of Forestry and their cooperators as will enable them to recognize the several stages of the disease.

8. It is understood that the Bureau of Plant Industry shall be primarily responsible for scouting and location of the blister rust in Oregon and for technical information on its control, but that the Federal Government has no authority to destroy private or state property and therefore the Oregon State Board of Horticulture shall be wholly responsible for the destruction of such pine, currant and gooseberry plants as may be found necessary in order to control the spread of this disease in Oregon, including plants shipped in violation of State and Federal blister rust quarantine regulations.

9. This memorandum of understanding shall take effect July 1, 1924 and continue in force until June 30, 1925, or until previously terminated by mutual consent of the parties concerned.

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SIGNATURES:

Date

August 7, 1924	(Sg.) Chas. A. Park Oregon State Board of Horticulture Pres.
August 7, 1924	(Sg.) T. A. Elliott, State Forester Oregon State Board of Forestry.
August 8, 1924	(Sg.) H. P. Barss, Plant Pathologist O.A.C. Oregon Agricultural College.
August 27, 1924	(Sg.) K. F. Kellerman Acting, Chief Bureau of Plant Industry U. S. Department of Agriculture.

To directly supervise blister rust work in Oregon, Mr. L. N. Goodding, of this Office is stationed at Corvallis. The following report by Mr. Goodding covers his work during the past year.

The work of 1923 was of such a nature that it shaped a program for 1924. Many of the blank forms used in 1923 proved practicable for 1924 as well. There was a decided abatement of the work in the schools as it was found that the continuous circularizing of the teachers failed to bring the desired results. Only one letter was sent out during the year. This was in the nature of a follow-up of the fall campaign and was intended for use as a poster on bulletin boards. Nothing more should be done until the Office is prepared to coöperate with the State Superintendent to put something of a permanent nature into the Schools.

The principal work done was black currant eradication. A crew of five men was placed in the field June 15 to locate and eradicate black currants. Two Fords and three bicycles constituted the chief means of travel. Two additional men were sent from the Spokane office in August and another Ford was brought into service. These last two men remained in the Oregon work about a month. The territory covered was mostly west of the Cascades and south of the northwest counties which had been worked the previous season. The accompanying table shows the status of this work.

The eradication work was supplemented by that of the State Horticultural Board. All of the federal men were deputized by the State Board, and county fruit inspectors cooperated with them in location and eradication work. Mr. Dow, the county fruit inspector in Clatsop County secured the eradication of Mr. Bates' bushes, an excellent piece of work, as this case threatened to involve the state in a court procedure.

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Correspondence was carried on with individual fruit inspectors and each was supplied with blister rust literature.

A copy of the form of deputation supplied the blister rust scouts accompanies this report. As there are five commissioners in Oregon, it was necessary to have these deputations signed by the commissioners in charge of the districts in which eradication work was done.

In cooperation with the State Forestry Department letters were sent to about 400 fire wardens and other officials. No report of Ribes and pine distribution was madè, as this work had been done during 1923. At the meeting of the state fire wardens in July, blister rust was discussed for perhaps 40 minutes. An excellent spirit of interest and cooperation prevailed.

Owing to the extremely dangerous fire season, the blister rust work of the U. S. Forest Service was suspended. Reports of Ribes and pine distribution for most of the Forests had been received, however, through Dr. Boyce's office. While the information given was in some cases excellent, all showed the densest ignorance of blister rust. This is the fault of the blister rust office. The Blister Rust News Letter and other types of special blister rust literature should reach the federal forest service men frequently.

After Mr. Goodding had conferred with Professor Maris, Director of the Extension Service, O. A. C., and with Professor Johnson of the same department, letters were written to all of the county agents notifying them of the date when blister rust scouts would be likely to reach their territory and requesting them to assist the scouts in publicity work and in whatever ways seemed best. The county agents were especially helpful in getting exhibits placed at county fairs.

Exhibits were put up at county fairs in Linn, Lane, Coos, Josephine, and Deschutes Counties and at the State Fair at Salem. It was impossible to get material together to put exhibits at other county fairs, one great trouble being that many of the fairs occurred on approximately the same dates. At each of the county fairs where exhibits

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Exhibits were put up at county fairs in Linn, Lane, Coos, Josephine, and Deschutes Counties and at the State Fair at Salem. It was impossible to get material together to put exhibits at other county fairs, one great trouble being that many of the fairs occurred on approximately the same dates. At each of the county fairs where exhibits

were placed, literature was distributed. Mr. Wyckoff's summary reached Corvallis too late for use in connection with these exhibits except those at the State Fair and the Deschutes County fair. Sets of questions and answers on blister rust were used in the other cases. The exhibit at Salem attracted much attention. The exhibits in Lane and Coos Counties were poorly placed and did little good. Like much educational work, the value of exhibits must be estimated by eyes of faith, as tangible results are seldom forthcoming.

Newspaper work consisted largely in write-ups in the different counties in which black currant eradication took place. In every case the newspaper men were given interviews and in most cases excellent and effective write-ups were made. The value of the local news sheet as an educational medium is very great. It seems to be more generally read by the country folk than the large dailies. The way for the scout is prepared by the write-up in the local paper and this is a distinct advantage.

The blister rust filmw was first run at the Flower Show at the College in Corvallis. It was run at least 12 times a day for three days. Literature was distributed at the same time. The film was also run at Salem, Eugene, Albany, Silverton, and Grants Pass. In each town the film was shown at the regular motion picture houses for matinee and evening performances, two days at Salem and three at the other points. No literature could be distributed in these places.

The Botany Department at O. A. C. is giving a prominent place in its courses to blister rust study. Three things seem to stimulate this. First, the Office having a man permanently stationed at the College; second, Professor Barss being a member of the executive blister rust board; third, the fact that many O. A. C. students are used in blister rust work during the summer.

The Forestry Department at O. A. C. and the Botany Department of the State University have made repeated requests for blister rust exhibits. To date, nothing has been provided.

No special nursery inspection work was done except at the Oregon Nursery at Orenco. All nurseries in the region where black currants were eradicated were thoroughly inspected, however, at the time such localities were reached by the scouts. These inspections revealed in some cases a few black currants which had sprouted from crowns left in the ground when the nurseries had destroyed the bushes. In every case, however, such sprouting was slight. The eradication force did scouting for blister rust along the Columbia below Portland and in western Washington during October, but this is reported elsewhere.

WHITE PINE BLISTER RUST
by

Leslie N. Goodding, Assistant Pathologist,
Office Blister Rust Control,
U.S. Department of Agriculture.

In the consideration of this subject reference should be made to the last beinnial report pp. 220-226 which discusses in detail the nature of the disease together with facts regarding its distribution and means taken at that time to control it.

For those who may not have access to the last biennial report the following brief summary of the nature and life history of the disease may be helpful. It is caused by a fungus destructive to white pines of all ages. It also causes disease on currants and gooseberries. The latter plants are necessary to the spread of the rust to the pines as it never passes from pine to pine. Among the currants and gooseberries the most susceptible are the cultivated black currants, a variety introduced from Europe. The disease is perennial on the pines, requiring two years or more from date of infection before it becomes evident and spores begin to shoot and from few to many years thereafter for the tree to die. During this time it is annually producing spores. On the currants and gooseberries the disease disappears in the late autumn or winter with the fall of leaves and reappears about two weeks after the first spores from diseased pines have germinated on the leaves in the spring. The first phase of the rust occurring on the currants and gooseberries produces spores which carry the disease to other currants and gooseberries. Thesecond phase produces spores which ultimately cause the disease to go to the pines.

The rust is not a native to this country. It was introduced from Germany into the eastern United States about 1900 and from France into the Northwest about 1910. Since its discovery in the East in 1906 its extreme seriousness has been learned and methods of control developed. It was not discovered in the Northwest until 1921 and since that time the West, learning a lesson from the very expensive experience of the East, has been active in inaugurating control methods.

Since the last biennial report went to press much has been learned of the distribution of the disease in the Northwest. The scouting in British Columbia in 1923 revealed the disease in an almost continuous belt from the Vancouver region to Revelstoke and Beaton. The arid valleys between the mountain ranges showed the disease to be widely distributed on cultivated black currants. The infection was even found extending into the Okanogan region in eastern Washington and to a point within 35 miles of the Idaho line in British Columbia

The area of infection about Beaton and Revelstoke proved to be very extensive. When it is recalled that Beaton and Revelstoke are in the belt of western white pine extending south into Idaho and Montana the seriousness of the situation can be comprehended. Up to the close of the scouting season of 1923 only three disceased pines had been found in the State of Washington, the very wide distribution being on cultivated and native black currants. Two of the lecations on pines were found in Mt. Vernon and one in Blaine, neither of which are far from the Canadian boundary. In the spring of 1924, however, disceased pines were found on both sides of the Olympic peninsula at points much farther south than Mt. Vernon. Ilwaco remains the furthest point south for infected currants, there being no report of the disease up to this time in Oregon.

Investigations in British Columbia since the discovery of the disease in 1921 have revealed that spores from diseased pines may be viable and may produce the disease after being carried by the wind at least 100 to 150 miles. This results in the rapid spread to currants and gooseberriesduring seasons favorable to the development of rusts. Such seasons are those having high humidity. Heavy daews are apparently as good as rains. The summer of 1922 and 1923 were favorable for the spread of the rust whereas 1924 was very unfavorable. During the last season it was not found at many of the points distant from centers of pine infection where it was found the two preceeding seasons. This must not, however, be taken to mean that the disease is receding. Infected pines constitute the real outposts of the disease. The diseased pines on the Olympic Peninsula may be expected to spread the rust far beyond its present known range when a favorable rust year occurs.

Since the rust was found in the Okanogan region in eastern Washington all thought that natural barriers to the disease may exist has been abandonded. The existance of the rust in the heart of the dry belt and east of the Coast Range serves to convince the most optimistec that the disease is not stopped by anything short of an ocean.

As stated in the last biennial report western white pine is very susceptible to the disease, in fact, it seems to be the most susceptible species known. As the rust has never reached the sugar pine areas its action on the species might be questioned if Europe had not supplied us with all the evidence needed. Sugar pine is one of the white pines introduced into Europe from America and like the others it has fallen a victim to Blister Rust.

Convincing evidence continues to pour in against the cultivated European Black Currant (R. nigrum). Owing to its extreme susceptibility and the open locations in which it is grown subjecting

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Convincing evidence continues to pour in against the cultivated European Black Currant (R. nigrum). Owing to its extreme susceptibility and the open locations in which it is grown subjecting

it to influence of the winds other currants or the gooseberries are not to be compared with it as a menace to the growing of white pines. In Farmers' Bulletin #1398 the U.S. Department of Agriculture goes on record in favor of discontinuing the growing of these currants thouroghout the entire United States.

Two additional seasons of scouting have shown that the native black currant (Ribes bracteosum) growing west of the Cascades is a serious host of the rust, in fact, second only to the cultivated European black currant. It, however, is confined to stream banks and marshy places, often in dense shade, and is never exposed to the winds as the European black currant. For this reason it cannot become so seriuous a menace in the spread of spores. It will be well to watch this native black currant. In case o the disease is discovered within the state any of these bushes near cultivated white pines should be removed at once. This is equally imperative in native white pine stands but the magnitude of the undertaking would demand special consideration.

The control measures remain essentially the same as those enumerated in the last report. Since that time, however, Oregon, Idaho, and Montana have made special provision to eradicate the cultivated black currants and active steps have been taken to that end. Oregon has destroyed about33,000 bushes. Most of the counties west of the Cascades where the growing of these plants was common have been covered by eradication crews.

Thorough scouting has been done each season not only in Oregon but throughout the northwest to determine the boundaries of the disease. In Oregon state and county inspectors, Fire Wardens of the State Department of Forestry, school teachers, pupils and many others have cooperated in scouting for the disease.

The Federal government in cooperation with the state of Oregon has maintained a rigid quarantine against the introduction of currants, gooseberries or white pines from the state of Washington or from east of the west line of Minnesota, Iowa, Missouri, Arkansas, and Louisiana. Federal inspectors have been maintained at Portland and Pendleton and state and county inspectors at many points throughout the state. In the absence of a federal inspector at Portland during the fall of 1923 the work was done by special provision of the State Board of Horticulture.

Nursery inspection has been faithfully done each season by federal scouts in connection with the general scouting for the disease. This work has been augmented by the state and county inspectors.

The Federal Blister Rust office in cooperation with timber men, state and federal forestry organizations and the different state departments of agriculture and horticulture in the Northwest has inaugurated a ten-year Blister Rust program designed to control the

disease in white pine areas. This program provides for extensive local control work, black currant eradication, quarantine enforcement, general scouting for the disease and experimental work. Provision is made in this program for continuing black currant eradication in Oregon, for quarantine inspection at Portland and Pendleton, for general scouting for the disease, and for experimental local control work in a sugar pine region. Since the disease is not in Oregon at present the local control work will consist in the experimental eradication of currants and gooseberries in a designated area of sugar pines as a means of learning best methods and costs.

School children were enlisted in the campaign to locate cultivated black currants though they were also asked to send specimens they thought were diseased to the Agricultural College. This work proved to be most satisfactory in disseminating knowledge about Blister Rust. Many black currant locations also were obtained in this way. The State Forestry organization, the Extension Service of the Oregon Agricultural College, the State Horticultural organization, the Department of Industrial Journalism of the Oregon Agricultural College and the newspapers of the state assisted in the general educational work. Some of the most enthusiastic workers have been former black currant owners.

The Western Office of Blister Rust Control has been transferred from Seattle to 618 Realty Building, Spokane, Washington. Mr. S. N. Wyckoff has charge of the western work. An office for Oregon is also maintained in connection with the Botany Department of the Oregon Agricultural College. It is unnecessary for those wishing information about Blister Rust to write to the Spokane office as the office in the college is in a position to supply litueterature and answer your questions about Blister Rust. Address your inquiry either to Mr. Leslie N. Goodding or to Professor H. P. Barss, Botany Department, Oregon Agricultural College, Corvallis, Oregon.

COOPERATIVE BLISTER RUST CONTROL.

Oregon State Board of Forestry, Oregon Agricultural College, and The Bureau of Plant Industry, U. S. Department of Agriculture.

Botany Department, O. A. C.,
Corvallis, Oregon,
June 1, 1924.

Dear Sir:

Blister Rust Again. Last season we failed to find it in Oregon but this should not make us less vigilant this season for the disease is advancing and we may expect it to creep in at any time.

The Blister Rust Office is putting a crew of men into the field again this summer. These men will locate and eradicate all the cultivated black currants possible, and inspect pines, currants and gooseberries for Blister Rust.

To make their work most successful these men need the cooperation of every possible agency that can be enlisted in their support within the state. By virtue of their duties and the localities in which they work the fire wardens can render valuable assistance.

The suggestions contained in this letter meet with the approval of Mr. Elliott, the State Forester.

Judging the fire fighters by past performances we are relying on you as one of them to cooperate with us:

1st. By keeping a keen lookout for Blister Rust on both five-needled pines and the currants and gooseberries.
2nd. By reporting at once to the Blister Rust Office at the Agricultural College at Corvallis any case you suspect of being Blister Rust.
3rd. By reporting plantings of cultivated black currants.
4th. By assisting the Blister Rust Scouts when they reach your locality in every way your duties will permit.
5th. By spreading reliable information about Blister Rust.

Under separate cover I am sending you literature on the subject.

Thanking you for your cooperation, I am

Yours very truly,
Leslie N. Goodding
Junior Pathologist.

LNG/K

Thirty-second Legislative Assembly--Regular Session.

HOUSE BILL NO. 263.

Introduced by MR. CRAMER (by request) and read first time January 29, 1923.

A BILL

For an act to declare the cultivated black currant (ribes nigrum) and the common barberry (berberis vulgaris) and its varieties a public nuisance and providing for their eradication.

Be It Enacted by the People of the State of Oregon:

Section 1. The cultivated black currant (ribes nigrum), a most dangerous host plant of the white pine blister rust disease (cronartium ribicola) which disease seriously attacks the five-needle pines including western white pines and sugar pines native to Oregon, and the common barberry (berberis vulgaris) and its varieties, a dangerous host plant of the black stem rust of wheat and other cultivated grains and grasses (puccinia graminis) are by reason of their menace to valuable products of the soil in Oregon hereby declared to be a public nuisance, and the several commissioners of the state board of horticulture, the state inspector, or the county inspectors are hereby invested with the power to abate the nuisance in a summary manner.

Section 2. It shall be unlawful for any company, corporation, society, association, partnership or any individual or combination of individuals in the State of Oregon to grow, propagate or distribute cultivated black currants (ribes nigrum) or common barberries (berberis vulgaris) or varieties of the same.

Section 3. Any company, corporation, society, association, partnership or any individual or combination of individuals violating the provisions of this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than one hundred dollars ($100).

COOPERATIVE BLISTER RUST CONTROL

Superintendent of Public Instruction, Oregon Agricultural College,
Bureau of Plant Industry, U. S. Department of Agriculture.

OREGON'S FORESTS: "A GOOSE WITH A GOLDEN EGG."

The total value of Oregon's agricultural crops, including fruit, in 1922 was $75,000,000.

The value of the lumber cut in Oregon in the same period was $100,000,000.

43,000 persons were employed directly in the lumber industry. Lumbering provided 65% of the industrial payroll of the state.

Then the chief crop of Oregon is not wheat, hay, apples or prunes but lumber and --

The prosperity of our state depends upon the protection and perpetuation of all and every integral part of our forests.

White and Sugar pines form about two percent of our entire forests, and from the standpoint of quality yield the most valuable lumber. As these stand in the forest, untouched by axe or saw, they are worth $27,000,000.

If White Pine Blister Rust is introduced and not controlled it will destroy our White and Sugar pine forests.

CULTIVATED BLACK CURRANTS are the chief agents in contracting, harboring and spreading this disease. They should be destroyed. The law of the state demands their destruction.

Have your pupils located all the CULTIVATED BLACK CURRANTS in your district?

If you surmise that some bushes have been overlooked will you have the children renew their search this spring?

The literature sent you last fall will tell you all about this disease.

Yours for the preservation of Oregon's White and Sugar pines.

F. P. Barss,
Collaborator.

NOTE: Please post this where it will be read by your teachers.

Agricultural College,
Corvallis, Oregon,
April 15, 1924.

Careful record should be entered on these sheets from the field notes at the close of each day.

------------------------County

Name of Black Current Owner	Post Office Address	Locality	Date	Removed by	Remarks

QUESTIONS AND ANSWERS CONCERNING THE DISEASE

WHITE PINE BLISTER RUST

1. Q. What is white pine blister rust?
   A. It is a plant parasite which attacks white pines and currants and gooseberries and is very destructive to white pines. It is very similar in nature to grain rust which attacks the barberry as well as the grain.

2. Q. How can we recognize it?
   A. A rust is so called because it resembles rust as that on iron. The stage first appearing on the currant or gooseberry leaves strikingly resembles small spots of rust on the under surface of the leaves. A later stage has the appearance of short hairs. It is always well to send leaves you think are diseased to the Botany Department, Oregon Agricultural College, Corvallis, Oregon. It is in a position to give you definite information. On white pines the rust makes its appearance as swellings on branches or the main stem or bole. These swellings crack open and orange colored spore bodies protrude. These are not only visible; they are conspicuous. From these spore bodies millions of spores are released which infect currants and gooseberries.

3. Q. Does this disease attack other plants?
   A. It attacks only the pines, currants and gooseberries.

4. Q. Does it do much damage?
   A. It kills white pines of all ages and its presence in a region makes it impossible to grow these trees.

5. Q. Can it be controlled?
   A. It can. It is only necessary to destroy all currants and gooseberries in regions where we wish to grow white pines. The disease never passes from pine to pine. It passes from pines to currants and gooseberries, from currants and gooseberries to other currants and gooseberries and finally from currants and gooseberries back to the pines.

6. Q. Has the disease been found in Oregon?
   A. It had not been found up to June 1, 1924, but it will not be surprising if someone finds it this season.

7. Q. Is it doing any damage except in the Northwest?
   A. It has already done great damage in the New England States and is costing thousands of dollars annually for local control there and in Wisconsin and Minnesota. The disease in Europe has made the commercial growing of white pine impossible.

8. Q. Where did the disease come from?
   A. It was introduced into eastern United States from Europe some time before 1906 on nursery stock. The disease was introduced into British Columbia direct from Europe some years later.

9. Q. In what ways can I assist in controlling this disease?
   A. a. Send specimens you suspect of being diseased to the Blister Rust Office, Botany Department, Oregon Agricultural College, Corvallis, Oregon.
      b. Report to the same office information about any cultivated black currant plantings remaining in the State.
      c. Be careful not to order plants in violation of the state or federal quarantines.
      d. Spread information to your neighbors about the disease.

QUESTIONS AND ANSWERS ABOUT THE CULTIVATED BLACK CURRANT

AND ITS RELATION TO WHITE PINE BLISTER RUST

1. Q. Why is the state eradicating the cultivated black currant and not all currants and gooseberries?
   A. Blister rust spores coming from great distances will produce the disease on cultivated black currants when other currants and gooseberries fail to take it. Again it produces spores in vast abundance and spreads the disease to both pines and currants or gooseberries much greater distances than any other currants or gooseberries. Cultivated black currants are of little value to the state while white pines are of vast importance.

2. Q. Is there any law compelling owners of cultivated black currants to destroy them?
   A. The last legislature passed a law forbidding the growing or sale of cultivated black currants.

3. Q. Are there many black currants in the state?
   A. We believe most of them have been destroyed. About 30,000 were removed during 1923.

4. Q. Were owners paid by the state or government for the bushes destroyed?
   A. They were not. Practically all owners were willing and anxious to cooperate in protecting our white pine forests. Over 17,500 bushes were removed by owners and the remainder were destroyed by scouts with the permission of the owners.

5. Q. Are not the wild black currants as bad as the tame ones?
   A. Extensive experiments and observations by the U. S. Department of Agriculture have shown that the cultivated black currant is much worse than the wild black one, which is a different kind.

6. Q. How can we recognize cultivated black currant bushes?
   A. The leaves have a strong odor, unpleasant to most people. Their lower surfaces are dotted with minute glistening glands resembling beads. The fruits are black. The leaves are similar in shape and size to those of the cultivated red currants but the points are sharper.

7. Q. Will destroying the cultivated black currants keep the disease out of Oregon?
   A. It is possible that their eradication may keep it out for some years. Should it finally gain an entrance the absence of black currants will slow up its advance very materially.

8. Q. If the eradication of our cultivated black currants will not keep the blister rust out of our pines permanently are we not throwing away a valuable fruit industry to no avail?
   A. The cultivated black currant industry is of very little value to the State. If the disease can be checked until local control methods can be developed in white pine regions we will have gained many times the value of the cultivated black currants.

9. Q. Isn't this black currant eradication advocated by the lumbermen and are they not the ones to benefit by it?
   A. The eradication of cultivated black currants is advocated primarily by the U. S. Department of Agriculture and the State Board of Horticulture. The timber owners should, of course, be interested in it as should all citizens of the State, but protection of the forests against fire and disease is not primarily work for the lumbermen, since the prosperity of the entire state and the nation is inseparably linked to the forests. Standing forests mean sustained yields of lumber for houses and barns and bridges, sustained employment and payrolls. Sustained payrolls mean sustained markets for butter and apples and shoes. Sustained forests mean sustained prosperity.

10. Q. In many parts of western Oregon there are no white pines for stretches of a hundred miles or more. What possible harm could a few patches of cultivated black currants do in such a region?
    A. This can best be answered by an observation on what the disease has done. Western Washington is not unlike western Oregon in the scarcity of white pines. Government scouts were unable to locate white pine in Washington within fifty miles of Ilwaco but a very heavy infection was found there on cultivated black currants last fall. What has happened in Washington may happen in Oregon. Remember the disease will travel for many miles from pines to cultivated black currants. It will travel from currant to currant. The more cultivated black currants we have the faster the disease will travel.

11. Q. Is there danger of the disease invading eastern Oregon?
    A. Arid conditions do not seem to be an efficient barrier as is shown by the fact that the disease was found in ten places on black currants in the Okanogan region of eastern Washington during the summer of 1923.

QUESTIONS AND ANSWERS CONCERNING WHITE PINES

1. Q. Are white pines of commercial value?
   A. The most valuable standing timber in the West today is white pine and there are vast quantities of it.

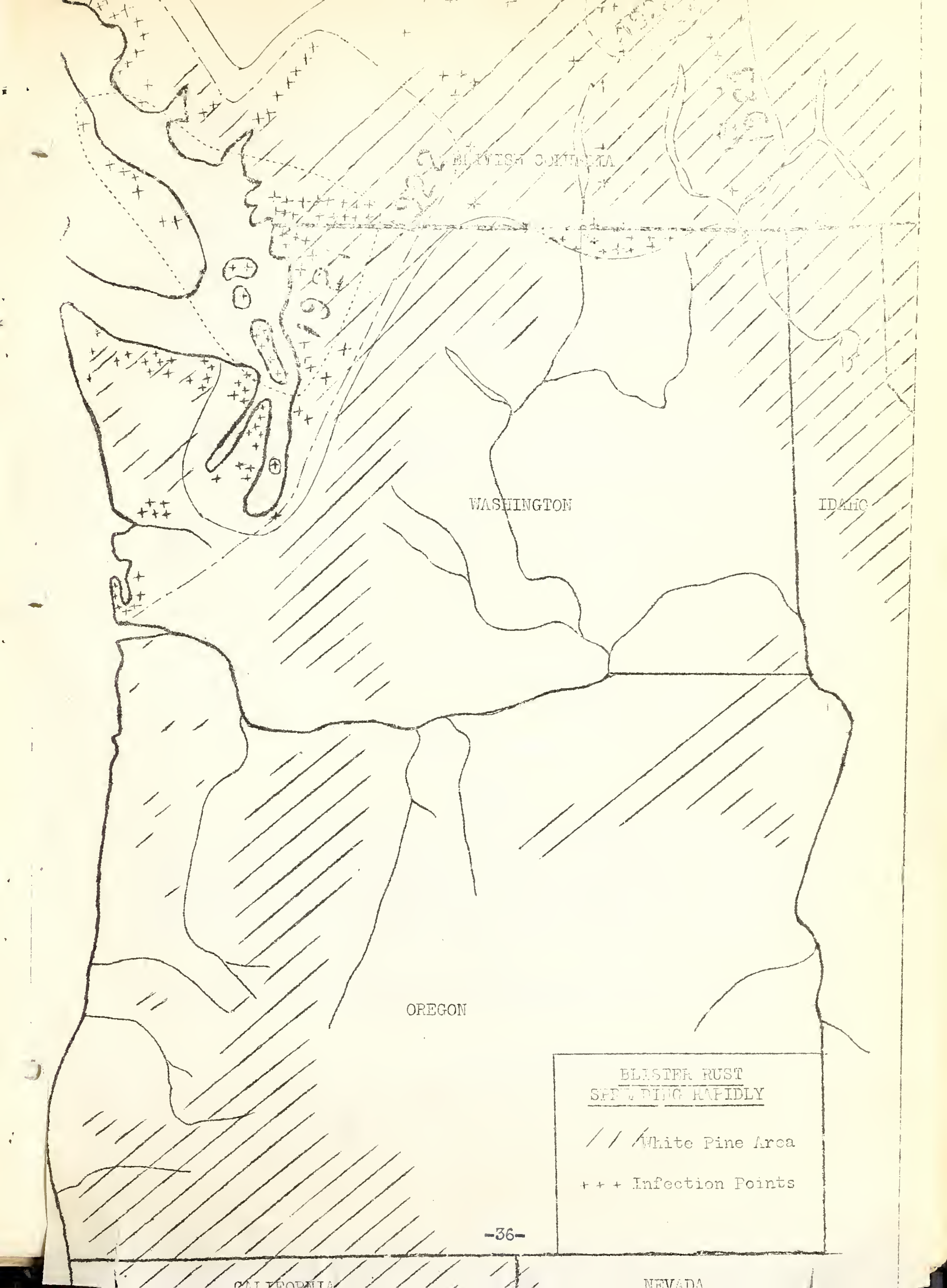
2. Q. Do they occur in Oregon?
   A. There are two kinds of white pine of great commercial value in the state. These are the western white and sugar pines. A third occurs in the high mountains and is not commercially important. It is the so-called white bark pine.

3. Q. How may I know a white pine?
   A. It has five needles in a bundle. All pines with this character in the northwest are white pines.

4. Q. Where are the white pines in Oregon?
   A. A glance at the accompanying sketch map will give you an idea of their general distribution. Over much of this area they are very scattering but they are of commercial importance along the Cascades and in southern Oregon. Polk County also has some commercial white pine timber.

5. Q. What is the value of Oregon's white pine timber?
   A. A government estimate based on the value of the standing timber is $27,000,000 for the western white and sugar pines.

6. Q. Are there not other trees equally as valuable which can be used in reforestation and which are not subject to white pine blister rust?
   A. No. White pine holds a unique place in the lumber market. White pine lumber always commands a higher price because of its very superior qualities. It also adapts itself to reforestation as it comes in readily after fires and lumbering operations and is a rapid growing tree.


BRITISH COLUMBIA
WASHINGTON
IDAHO
OREGON
BLISTER RUST
SPREADING RAPIDLY
White Pine Area
+ + + Infection Points
CALIFORNIA
NEVADA

Notices and Release Statements Used in Cultivated Black Currant Work in Oregon

Post Office Address of Owner ____________________ Date ____________________

Realizing the great danger to Oregon's white and sugar pine forests from the existence within the state of cultivated black currants because they are the chief means of the spread of the destructive white pine blister rust disease,

(have destroyed
I
(have permitted a Federal or State Inspector to destroy cultivated black currant bushes as described below, which is the total number on my premises, and as the State has made no provision, I hereby waive any claim for compensation for the bushes destroyed.

No. of bushes	Age	Condition

Inspector ____________________ Signature of Owner ____________________

****

Notice

In compliance with the provisions of Chapter 95 General Laws of Oregon, 1923, entitled "An act to declare the cultivated black currant (Ribes nigrum) and the common barberry (Berberis vulgaris) a public nuisance and providing for their eradication and providing a penalty," you are hereby instructed to uproot and destroy the cultivated black currants on your premises.

I shall re-inspect your grounds______days from this date to see the the provisions of this law have been complied with.

____
County Fruit Inspector.

____________19____

Notice

In compliance with the provisions of Chapter 95, General Laws of Oregon, 1923, entitled "An act to declare the cultivated black currant (<u>Ribes nigrum</u>) and the common barberry (<u>Berberis vulgaris</u>) a public nuisance and providing for their eradication and providing a penalty," I have this ________ day of ______ 1924 uprotted and destroyed_______ black currant bushes, the total number I found on your premises.

____
Special deputy of Oregon State Board of Horticulture

________________19______

COOPERATIVE BLISTER RUST CONTROL
Oregon Agricultural College, Bureau of Plant Industry,
U. S. Department of Agriculture.

Botany Department, O. A. C.,
Corvallis, Oregon,
June 1, 1924.

The Blister Rust Office, cooperating with the State Board of Horticulture is planning to complete the eradication of the cultivated black currants in Oregon this season. A crew of men will be placed in the field June 15th. These men will locate and eradicate bushes as rapidly as possible.

As this work is being done directly under the authority of the State Board of Horticulture, and in cooperation with its members we are relying on your assistance. Some one of this crew will visit you in the course of the work and plan the campaign to be carried out in your county. Your familiarity with your county will help the crew in locating outlying communities and abandoned homesteads.

Any bushes you can locate and have eradicated prior to the time the crew reaches your county will be that much off the slate and assistance of this kind will materially speed up the work.

I am enclosing a pad of blank notices you may find of service. This form is approved by Mr. Park, President of the State Board of Horticulture.

Thanking you for your cooperation, I am

Yours very truly,

Junior Pathologist.

LNG/K

WHITE PINE BLISTER RUST IN THE NORTHWEST

By S. N. Wyckoff.

* * *

WHAT IT IS

White Pine Blister Rust is a fungous disease which spreads on currant and gooseberry plants and attacks and kills white pines. The western white pine or Idaho white pine, of Montana, Idaho, Oregon and Washington, and the sugar pine of Oregon and California are subject to attack by this disease, and its near approach now threatens valuable forests of these timber trees with destruction.

Blister rust was unknowingly brought from Europe into eastern United States over twenty years ago, and since then has established itself in the eastern white pine forests and caused severe losses in stands which have not been protected by local control. It was probably introduced on young white pines imported from Europe and planted at Vancouver, B. C. in 1910 but was not discovered until 1921. The following map will show where it is now known to occur, and the rate at which it is spreading.

HOW IT SPREADS

Blister rust is very peculiar in that it spends part of its life on the pine and part on currants and gooseberries. It does not attack any other trees or shrubs. It generally appears on the bark of white pine trees two or three years after infection takes place. The bark becomes swollen, and in the spring small whitish sacs push their way to the surface. These break and liberate millions of small seed-like bodies known as spores. These spores, as they are blown about by the wind, do not infect other pine trees, but form a rust on the lower leaf surfaces of currant and gooseberry plants. There another type of spore is formed in early summer which infects other currant and gooseberry leaves. In autumn, small brown hair-like bodies are formed on these leaves, which give rise to spores that infect white pines. On the pines, the disease lives in and under the bark, and kills the tree by girdling it.

VALUES AT STAKE

The present stand of commercial five-needle pines in the United States is 78,571 million board feet. Approximately three-fourths of this timber, 57,071 million board feet, is in the western forests. The two important commercial species are western white pine and sugar pine. These are the most valuable forest trees found in the West. White and sugar pines

to 1918, more than one-third of the lumber produced was western white pine, and in California during the same period one-tenth of the lumber produced was sugar pine. The lumber manufactured from these pines is more valuable than that of other species; therefore these proportions are greater in dollar value than in board feet. The blister rust is already firmly established in British Columbia and has spread into northern and western Washington. The continued spread of this disease may eliminate our white and sugar pine crops of the future unless we are successful in controlling this disease. The loss of this timber would be felt by everyone in the West, whether or not he owns timber, because many articles of common daily use, such as matches, doors, windows, frames, mouldings, and many parts of farm machinery are better made from white pine than from any other lumber and large numbers of wage earners are sustained by these industries.

COMBATIVE MEASURES

The United States Department of Agriculture, in cooperation with western State officials and others interested in the preservation of white pine, is endeavoring to delay the spread of this disease and devise methods for its control. Extensive experimental work is now under way to improve methods of protecting white pine timber and young growth by the removal of all wild currant and gooseberry plants from the woods. Also a general program of eradication of cultivated black currants is being conducted in the western pine growing states.

DELAYING THE SPREAD OF THE RUST

(a) by eradication of cultivated black currants.

Cultivated black currants, sometimes called the European or English black currant, are more susceptible to white-pine blister rust than any other type of currant or gooseberry. This species is the most active agent concerned in the long-distance spread and establishment of white pine blister rust. That is, cultivated black currant plants become heavily infected at great distances from diseased pines, and because of their extreme susceptibility to the rust, establish centers of infection from which the disease spreads rapidly to other kinds of currants, gooseberries, and white pines. Compared to cultivated black currants, other species of currants and gooseberries are relatively resistant to blister rust. However, in the course of a season the disease may spread on any type of currant or gooseberry from the original black currant center, because of successive cycles of the summer stage of the rust.

The United States Department of Agriculture regards the cultivated black currant a distinct menace to the white pine timber supply of the country. It is a menace not only to the thousands of farm owners who grow white pine in their woodlots or in their shelter belts and dooryards, but also to all citizens, since all use white pine lumber directly or indirectly. The common cultivated black currant is so serious a danger to the production of white pine timber as to make

this currant a public nuisance in all states where white (five needled) pines grow. Because of these facts the United States Department of Agriculture is opposed to the growing of this species of currant (Ribes nigrum) anywhere in the United States and recommends that State authorities, nurserymen, and growers take active steps to accomplish its elimination from the Pacific, Rocky Mountain, Atlantic, Appalachian, Ohio Valley, upper Mississippi Valley, and Lake States. The growing of cultivated black currants, in home gardens as well as in nurseries and commercial plantings, should be entirely abandoned throughout these states, because of the great importance of the white pines, and the relatively small value of the black currants. There are some individuals to whom the loss of cultivated black currants will mean a measurable sacrifice. But the menace of the blister rust to our white pine forests demands this sacrifice, since the spread of the rust cannot be checked in any other way.

(b) by preventing unlawful movement of host plants.

Quarantine laws have been enacted by the Federal Government and the several States which are designed to prevent the further spread of blister rust by shipment of diseased plants. These quarantines prohibit (1) the shipment of all white pines, currants and gooseberries into the United States from any foreign country; (2) the shipment of these plants into the West from all states east of and including Minnesota, Iowa, Missouri, Arkansas, and Louisiana; and (3) prohibit their shipment out of the State of Washington.

HOW YOU CAN HELP

Everyone in the West can and should help in fighting the blister rust. They can help in the following ways:

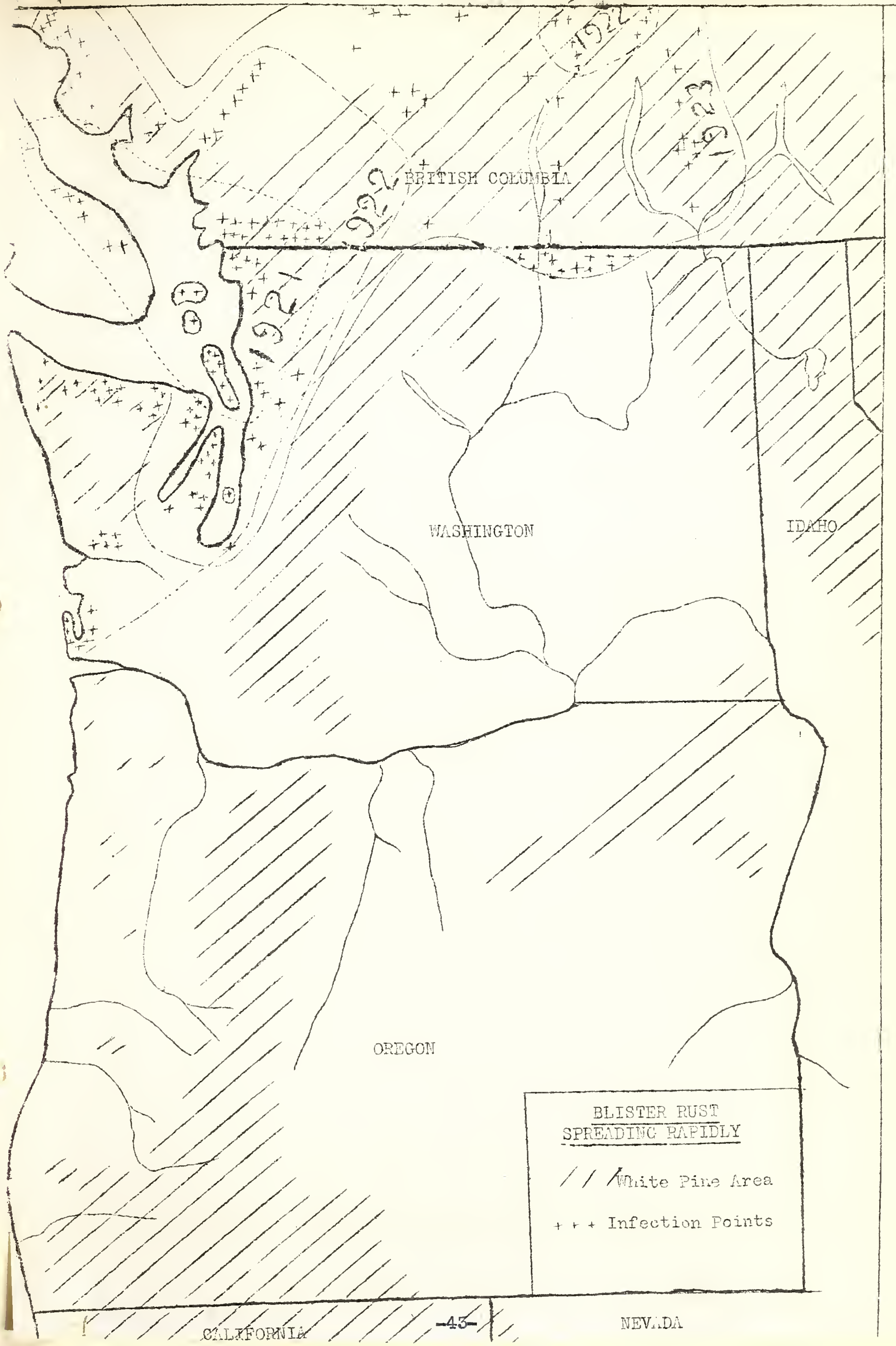
1. By destroying any cultivated black currants which they may have in their gardens.

2. By helping to enforce the quarantine laws listed above.

3. By watching for the disease, as described here, on currants, gooseberries, or white pines, If anything suspicious is found, send it to L. N. Goodding, in care Botany Department, Oregon Agricultural College, Corvallis, Oregon; or the Office of Blister Rust Control, 618 Realty Bldg., Spokane, Washington.

For further information apply to L. N. Goodding, in care Botany Department, Oregon Agricultural College; State Forester, Salem, Oregon; or S. N. Wyckoff, 618 Realty Building, Spokane, Washington.

Issued by Office of Blister Rust Control
Bureau of Plant Industry,
U. S. Department of Agriculture.
September - 1924.


BRITISH COLUMBIA
1922
1923
1921
WASHINGTON
IDAHO
OREGON
BLISTER RUST
SPREADING RAPIDLY
White Pine Area
Infection Points
CALIFORNIA
NEVADA

1.15. Cultivated Black Currant Eradication in California

In August, 1924 a cooperative agreement between the California State Department of Agriculture, the California State Board of Forestry and the B. P. I. was drawn up, Mr. G. A. Root, of this office permanently assigned to work in this state, and cultivated black currant eradication work started. This work has been carried on continuously since last August.

The following report by Mr. Root will give the results of this past season's work in California.

White Pine Blister Rust Control Work
In California, 1924

Active work in the control of the White Pine Blister Rust took definite form, July 23, when the State Department of Agriculture of California approved a cooperative agreement with the Office of Blister Rust Control of the Federal Bureau of Plant Industry and the California State Board of Forestry. The agreement is as follows:

MEMORANDUM OF UNDERSTANDING BETWEEN THE CALIFORNIA DEPARTMENT OF AGRICULTURE, THE CALIFORNIA STATE BOARD OF FORESTRY, AND THE BUREAU OF PLANT INDUSTRY, UNITED STATES DEPARTMENT OF AGRICULTURE, RELATIVE TO COOPERATIVE WORK ON THE CONTROL OF THE WHITE PINE BLISTER RUST IN CALIFORNIA.

EFFECTIVE JULY 1, 1924, to JUNE 30, 1925.

The object of this memorandum of understanding shall be to facilitate the prompt location and eradication and effective control of white pine blister rust in California in view of the threatened destruction of timber throughout the West as a result of the presence of this disease in the west, and the danger of its further spread by natural dissemination or quarantine violation.

It is agreed that the California Department of Agriculture and the California State Board of Forestry, parties of the first part, and the Bureau of Plant Industry, United States Department of Agriculture, party of the second part, shall cooperate to the above ends in accordance with the following plan:

1. The California Department of Agriculture and the Bureau of Plant Industry shall cooperate with the Federal Horticultural Board in the strict enforcement of State and Federal blister rust quarantines now in effect

or which may be promulgated. The California Department of Agriculture and the Bureau of Plant Industry shall each pay the salaries and expenses and direct the work of one or more men who shall, during the proper season, inspect plant shipments for violations of these blister rust quarantines.

2. The Bureau of Plant Industry shall, for the field season of 1924, pay the salaries and expenses of one or more men, who shall do the necessary scouting for the disease and the locating of cultivated black currants in California.

3. The California Department of Agriculture shall use its regular employees so far as their other duties permit, andshall direct the work of its cooperating horticultural officials, so far as their other duties permit, in systematically locating cultivated black currants and infected blister rust host plants; in scouting for the blister rust; in inspecting nurseries for this disease and in enforcing State and Federal blister rust quarantines. It is recognized that the California Department of Agriculture has no special appropriation for blister rust control, and that therefore such blister rust control work as is performed by the employees of the California Department of Agriculture and its cooperating horticultural officials will be done in connection with their other duties. Such work will aggregate approximately 800man-days, representing a total expenditure of approximately $4000.00 for the control of this disease during the period covered by this agreement. The expenditures of the Bureau of Plant Industry, as indicated in the previous paragraphs, will aggregate approximately $4000.00, during the period covered by this agreement, but none of the Federal funds shall be spent in compensation for plants destroyed in control work.

4. The California State Board of Forestry shall use its regular employees, so far as their other duties permit, in systematically locating cultivated black currants and in scouting for the blister rust on its wild and cultivated host plants. Such work will aggregatea total expenditure by the California State Board of Forestry of approximately $1500.00 for the control of this disease during the period covered by this agreement.

5. All official records of the work performed under this agreement shall be open to inspection by any or all parties to this agreement. All findings of the blister rust made by any party to this agreement shall be promptly reported to all other parties to this agreement. All specimens collected by any part to this agreement, which are suspected to be

or which may be promulgated. The California Department of Agriculture and the Bureau of Plant Industry shall each pay the salaries and expenses and direct the work of one or more men who shall, during the proper season, inspect plant shipments for violations of these blister rust quarantines.

2. The Bureau of Plant Industry shall, for the field season of 1934, pay the salaries and expenses of one or more men, who shall do the necessary scouting for the disease and the locating of cultivated black currants in California.

3. The California Department of Agriculture shall use its regular employees so far as their other duties permit, and shall direct the work of its cooperating horticultural officials, so far as their other duties permit, in systematically locating cultivated black currants and infected blister rust host plants; in scouting for the blister rust; in inspecting nurseries for this disease and in enforcing State and Federal blister rust quarantines. It is recognized that the California Department of Agriculture has no special appropriation for blister rust control, and that therefore such blister rust control work as is performed by the employees of the California Department of Agriculture and its cooperating horticultural officials will be done in connection with their other duties. Such work will aggregate approximately 800 man-days, representing a total expenditure of approximately $4000.00 for the control of this disease during the period covered by this agreement. The expenditures of the Bureau of Plant Industry, as indicated in the previous paragraphs, will aggregate approximately $4000.00, during the period covered by this agreement, but none of the Federal funds shall be spent in compensation for plants destroyed in control work.

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5. All official records of the work performed under this agreement shall be open to inspection by any or all parties to this agreement. All findings of the blister rust made by any party to this agreement shall be promptly reported to all other parties to this agreement. All specimens collected by any party to this agreement, which are suspected to be

infected with blister rust, shall be submitted to the Bureau of Plant Industry for final determination. The Bureau of Plant Industry shall give such technical information to the employees of the parties to this agreement as will enable them to recognize the several stages of the disease.

6. It is understood that the Bureau of Plant Industry shall be primarily responsible for scouting and locating the blister rust in California, and for furnishing technical information on its control, but that the Federal Government has no authority to destroy private or State property and therefore that the California Department of Agriculture shall be wholly responsible for destroying such pines, currant and gooseberry plants as my be found necessary in order to control the spread of this disease in California, including plants shipped in violation of State and Federal blister rust quarantines.

7. This memorandum of understanding shall take effect July 1, 1924, and continue in force until June 30, 1925, or until previously terminated by mutual consent of the parties to this agreement.

Signatures

Date	Signature
7/22/24	G. H. Hecke Director, California Department of Agriculture
7/24/24	M. B. Pratt State Forestor
8/12/24	Wm. A. Taylor Chief, Bureau of Plant Industry, United States Department of Agriculture.

To more clearly define the purpose of the agreement the following working plan was devised:

Blister Rust Control Work in California
Season of 1924.

Purpose: To secure the elimination of cultivated black currants in the northern counties of California, in oreder to delay the rapid spread of blister rust into the sugar pine regions; (2) To

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G. H. Hecke Director, California Department of Agriculture	7/23/24 Date
M. B. Pratt State Forester	7/24/24 Date
Wm. A. Taylor Chief, Bureau of Plant Industry, United States Department of Agriculture.	8/12/24 Date

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Blister Rust Control Work in California
Season of 1924.

<u>Purpose</u>: To secure the elimination of cultivated black currants in the northern counties of California, in order to delay the rapid spread of blister rust into the sugar pine regions; (2) To

conduct general scouting in northern California, to determine if blister rust is now present in this state; (3) To acquaint the public with the possibilities of serious damage by blister rust, the values of sugar pine timber threatened by this disease, and the part played by the cultivated black currants in its dissemination.

Area covered: For the season of 1924, field work will be conducted in Modoc, Lassen, Siskiyou, Shasta, Trinity, Del Norte and Humboldt Counties, or as many of these counties as possible. General educational work will be conducted over the entire state.

Organization of work: This work will be conducted by the Office of Blister Rust Control, Bureau of Plant Industry, the California Department of Agriculture and its cooperating county horticultural officials, and the California State Board of Forestry.

The Office of Blister Rust Control will employ four men for two months to work under the direction of Mr. G. A. Root , who will conduct the field work in northern California.

The California Department of Agriculture and the State Board of Forestry will instruct their employees and cooperators to assist in this field work in every feasible way.

The field work will be conducted upon the basis of county units. In each county, Mr. Root will procure the proper maps and property records and will outline the work for his assistants. In outlining this work he will confer with and secure the assistance of any employees of the State Department of Agriculture, the State Board of Forestry, and the County Horticultural Commissioners.

After the work is properly organized, a thorough canvass ofeach county will be made by Mr. Root and his assistants to locate all plantings of cultivated black currants.

When any such plantings are found, these men will endeavor to secure their eradication through voluntary action on the part of the owner. If, after explaining the disease to the owner of the plants, he is willing to permit their eradication, his signature to the following statement will be secured.

Date ____________________

In order to assist in the control of the white pine blister rust, I hereby give ___________ cultivated black currant bushes to the proper agents of the United States Department of Agriculture or the State of California, in order that theses plants may be destroyed.

Name ____________________________

Address _________________________

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Name ______________________________

Address ______________________________

No plants will be removed until such a statement is signed by the owner.

Wherever it is compatible with their other duties, each County Horticultural Commissioner will assume reponsibility for the location and eradication of the cultivated black currants in a designated part of his county.

An educational program will be conducted by Mr. Root in each county in which field work is being carried on. This program will consist of the use of exhibits and posters, publicity in local newspapers, talks before local meetings, and the use of blister rust motion picture film.

Mr. Root will confer with the State Director of Extension, at Berkeley, to secure the assistance of the County Agents. No field work will be requested from the county Agents, but they will be requested to support the cultivated black currant program. They will be supplied with literature and exhibits, explaining the disease andthe work.

Mr. Root will confer with all rangers and other employees of the State Board of Forestry in counties where field work is being conducted. These men will assist the work in every way possible.

During the winter months, Mr. Root will carry on, alon,e, all possible field work, general educational work, and will further perfect the organization of his work for the field season of 1925.

Results of the Season's Work

Black Currant Eradication

General scouting and eradication of black currant bushes was started in northern California with two two-men crews on August 15. The men continued work until October 15. One man was retained until December 20, as this type of work could be carried on in certain parts of the State until a late date.

The usual method of eradication was carried on. As there is no law at present requiring the removal of these bushes, the scouts had to rely upon the good will of the owners. The following table gives the results of the field season of 1924 from August 15 to December 20, 1924.

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TABLE VI

County	Eradicated		Not eradicated		Total	
	Plantings	Plants	Plantings	Plants	Plantings	Plants
Lassen	9	45	---	---	9	45
Modoc	5	16	---	---	5	16
Shasta	6	14	---	---	6	14
Siskiyou	5	38	---	---	5	38
Trinity	2	8	---	---	2	8
Del Norte	4	13	---	---	4	13
#Humboldt	190	1454	5	33	195	1487
Total	221	1588	*5	*33	226	1621

#Not yet completed

*Still pending--further efforts are being made to secure their removal.

The above number of black currants eradicated represents the number destroyed through voluntary action on the part of the owners. In order to promote a better feeling and perhaps leave a more favorable impression of our work "Letters of Appreciation" were sent out to all black currant owners who consented to the removal of their bushes. These were not sent ou t without the desired effect for it was afterwards learned that in one instance such a letter practically saved the replanting of a portion of twelve of the largest bushes found this season. The letter is as follows:

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Plant Industry

Sacramento, California

Dear Sir:

It has been reported to me by one of our field men that cultivated black currants were found at your place, and that you gave consent to their removal to assist in protecting the sugar pine forests of California from damage by White Pine Blister Rust. We greatly appreciate your action in this matter and take this opportunity to thank you.

In the control of the White Pine Blister Rust, of which you no doubt have read or heard, one of the most important

methods is the eradication of the cultivated black currant. This particular variety takes the disease from great distances and is instrumental in spreading it far and wide. It is much more susceptible to the rust than any other wild or cultivated variety, hence its removal will prevent or greatly retard the spread of the disease to non-infected territory.

Should by chance the bush or bushes start to grow again, no doubt we can rely on you to remove the sprouts. It is sometimes very difficult to get all the roots.

In the vast expanse of territory which the field men have to cover, it is possible that some places may have been missed. We would be pleased to have you tell us of any other plantings of black currants in your neighborhood.

Please address all information to

Geo. A. Root, Asst. Pathologist
% State Department of Agriculture,
Sacramento, California

Splendid cooperation was obtained from the various agencies. The following is a copy of a letter sent to the Horticultural Commissioners by W. C. Jacobsen, of the State Department of Agriculture:

STATE DEPARTMENT OF AGRICULTURE
G. H. Hecke, Director
Sacramento

Sacramento, California
August 5, 1924

Mr. F. H. Taylor
County Horticultural Commissioner
Susanville, California

Dear Mr. Taylor:

This will serve to introduce Mr. G. A. Root, in charge of the Blister Rust Control Work in California.

Mr. Root is a representative of the office of the Pine Blister Rust Control and is anxious to conduct the program outlined to you in a previous letter in accordance with the general work that is being done throughout Northern California

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G. H. Hecke, Director
Sacramento

Sacramento, California
August 5, 1924

Mr. L. H. Taylor
County Horticultural Commissioner
Susanville, California

Dear Mr. Taylor:

This will serve to introduce Mr. G. A. Root, in charge of the Blister Rust Control Work in California.

Mr. Root is a representative of the office of the White Pine Blister Rust Control and is anxious to conduct the program outlined to you in a previous letter in accordance with the general work that is being done throughout Northern California

and the Northwest in stemming the spread of this disease among pines of the white pine variety which, in this case, resolves itself largely into being a protection of sugar pines.

The State Department of Agriculture will appreciate any assistance you can render Mr. Root.

Yours very truly,
DEPARTMENT OF AGRICULTURE

(Signed) W. C. Jacobsen, Chief,
Bureau of Plant Quarantine
And Pest Control.

Mr. M. B. Pratt, State Forester, sent out the following notation to his men:

CALIFORNIA STATE BOARD OF FORESTRY

SACRAMENTO

August 4, 1924

District Fire Rangers--

This will introduce Mr. G. A. Root, Specialist with the Bureau of Plant Industry, in Charge of Blister Rust Control Work in California.

Please give Mr. Root any assistance which you can while he is in your district. If it is possible for you to take him to places where he may desire to go, I wish you would do so providing it will not interfere with you duties.

Yours very truly,

(Signed) M. B. Pratt

STATE FORESTER.

Professor Crocheron of the Cooperative Extension Work of California, through his Assistant Mr. C. W. Rubel, issued the following letter to the Farm Advisors:

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SACRAMENTO

August 4, 192[illegible]

District Fire Rangers--

This will introduce Mr. C. A. Root, Specialist with the Bureau of Plant Industry, in Charge of Blister Rust Control Work in California.

Please give Mr. Root any assistance which you can while he is in your district. If it is possible for you to take him to places where he may desire to go, I wish you would do so providing it will not interfere with you duties.

Yours very truly,

(Signed) M. B. Pratt

STATE FORESTER.

Professor Crocheron of the Cooperative Extension Work of California, through his Assistant Mr. C. [illegible] Hubel, issued the following letter to the Farm Advisors:

August 9, 1924.

Mr. A. L. Campbell,
Farm Advisor,
Court House,
Redding, California

Dear Campbell:

You are probably aware of the efforts of the U. S. Department of Agriculture to control as far as possible the spread of White Pine Blister Rust which is so injurious to our forests. Mr. George A. Root, Assistant Pathologist in the Bureau of Plant Industry, is carrying on some control work in California this year in cooperation with the State Department of Agriculture. Mr. Root will visit Lassen County very shortly and will desire to consult with you regarding the work in that section. While perhaps there is not a great deal of actual work that you could do, you can probably be of great assistance in helping Mr. Root plan the work in that section and in supplying information to the people concerned through the medium of the Farm Bureau and other channels at your command. You will not be expected to carry on any field work in this campaign but we will be very glad indeed to have you support Mr. Root in every way that you possibly can.

Very truly yours,

Assistant State Leader of
Farm Advisors,
Northern Counties.

The County Horticultural Commissioners and members of the U. S. Forest Service gave valuable aid to the Blister Rust force in helping to locate many of the black currant plantings in the more remote sections of each county or forest district.

Education Work

This logically followed the course of the black currant eradication. Exhibits were displayed at the California State Fair in Sacramento, the Adin Fair in Lassen County, the Inter-mountain Fair at McArthur in Shasta County and the Shasta County Fair in Anderson. It is hoped next season to have an exhibit at a fair in each county if possible.

Newspaper articles were inserted in 15 local papers throughout the seven counties as well as in several of the larger newspapers elsewhere throughout the State. The Government Blister Rust film was shown in ten cities or towns. Several of the counties have but

August [illegible], 1924.

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Farm Advisor,
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Newspaper articles were inserted in the local papers throughout the seven counties as well as in several of the larger newspapers elsewhere throughout the State. The Government Blister Rust film was shown in ten cities or towns. Several of the counties have but

two show houses which put on pictures but once a week. The motion pictures are undoubtedly one of the best methods of presenting to the public, the Blister Rust in detail and the potential menace of the disease to California sugar pines.

Posters and bulletins were displayed and distributed throughout the working area, including a timely letter sent out from the main office in Spokane, Washington as follows:

WHITE PINE BLISTER RUST IN THE NORTHWEST

By S. N. Wyckoff.

* * *

WHAT IT IS

White Pine Blister Rust is a fungous disease which spreads on currant and gooseberry plants and attacks and kills white pines. The western white pine or Idaho white pine, and the sugar pine of California are subject to attack by this disease, and its near approach now threatens valuable forests of these timber trees with destruction.

Blister rust was unknowingly brought from Europe into eastern United States over twenty years ago, and since then has established itself in the eastern white pine forests and caused severe losses in stands which have not been protected by local control. It was probably introduced on young white pines imported from Europe and planted at Vancouver, B. C. in 1910 but was not discovered until 1921. The following map will show where it is now known to occur, and the rate at which it is spreading.

HOW IT SPREADS

Blister rust is very peculiar in that it spends part of its life on the pine and part on currants and gooseberries. It does not attack any other trees or shrubs. It generally appears on the bark of white pine trees two or three years after infection takes place. The bark becomes swollen, and in the spring small whitish sacs push their way to the surface. These break and liberate millions of small seed-like bodies known as spores. These spores, as they are blown about by the wind, do not infect other pine trees, but form a rust on the lower leaf surfaces of currant and gooseberry plants. There another type of spore is formed in early summer which infects other currant and gooseberry leaves. In autumn, small brown hair-like bodies are formed on these leaves, which give rise to spores that infect white pines. On the pines, the disease lives in and under the bark, and kills the tree by girdling it.

VALUES AT STAKE

The present stand of commercial five-needle pines in the United States is 78,571 million board feet. Approximately three-fourths of this timber, 57,071 million board feet, is in the western forests. The two important commercial species are western white pine and sugar pine. These are the most valuable forest trees found in the West. In Idaho, from 1914

to 1918, more than one-third of the lumber produced was western white pine, and in California during the same period one-tenth of the lumber produced was sugar pine. The lumber manufactured from these pines is more valuable than that of other species; therefore these proportions are greater in dollar value than in board feet. The blister rust is already firmly established in British Columbia and has spread into northern and western Washington. The continued spread of this disease may eliminate our white and sugar pine crops of the future unless we are successful in controlling this disease. The loss of this timber would be felt by everyone in the West, whether or not he owns timber, because many articles of common daily use, such as matches, doors, windows, frames, mouldings, and many parts of farm machinery are better made from white pine than from any other lumber and large numbers of wage earners are sustained by these industries.

COMBATIVE MEASURES

The United States Department of Agriculture, in cooperation with western State officials and others interested in the preservation of white pine, is endeavoring to delay the spread of this disease and devise methods for its control. Extensive experimental work is now under way to improve methods of protecting white pine timber and young growth by the removal of all wild currant and gooseberry plants from the woods. Also a general program of eradication of cultivated black currants is being conducted in the western pine growing states.

DELAYING THE SPREAD OF THE RUST

(a) by eradication of cultivated black currants.

Cultivated black currants, sometimes called the European or English black currant, are more susceptible to white-pine blister rust than any other type of currant or gooseberry. This species is the most active agent concerned in the long-distance spread and establishment of white pine blister rust. That is, cultivated black currant plants become heavily infected at great distances from diseased pines, and because of their extreme susceptibility to the rust, establish centers of infection from which the disease spreads rapidly to other kinds of currants, gooseberries, and white pines. Compared to cultivated black currants, other species of currants and gooseberries are relatively resistant to blister rust. However, in the course of a season the disease may spread on any type of currant or gooseberry from the original black currant center, because of successive cycles of the summer stage of the rust.

The United States Department of Agriculture regards the cultivated black currant a distinct menace to the white pine timber supply of the country. It is a menace not only to the thousands of farm owners who grow white pine in their woodlots or in their shelter belts and dooryards, but also to all citizens, since all use white pine lumber directly or indirectly. The common cultivated black currant is so serious a danger to the production of white pine timber as to make

this currant a public nuisance in all states where white (five needled) pines grow. Because of these facts the United States Department of Agriculture is opposed to the growing of this species of currant (Ribes nigrum) anywhere in the United States and recommends that State authorities, nurserymen, and growers take active steps to accomplish its elimination from the Pacific, Rocky Mountain, Atlantic, Appalachian, Ohio Valley, upper Mississippi Valley, and Lake States. The growing of cultivated black currants, in home gardens as well as in nurseries and commercial plantings, should be entirely abandoned throughout these states, because of the great importance of the white pines, and the relatively small value of the black currants. There are some individuals to whom the loss of cultivated black currants will mean a measurable sacrifice. But the menace of the blister rust to our white pine forests demands this sacrifice, since the spread of the rust cannot be checked in any other way.

(b) by preventing unlawful movement of host plants.

Quarantine laws have been enacted by the Federal Government and the several States which are designed to prevent the further spread of blister rust by shipment of diseased plants. These quarantines prohibit (1) the shipment of all white pines, currants and gooseberries into the United States from any foreign country; (2) the shipment of these plants into the West from all states east of and including Minnesota, Iowa, Missouri, Arkansas, and Louisiana; and (3) prohibit their shipment out of the State of Washington.

HOW YOU CAN HELP

Everyone in the West can and should help in fighting the blister rust. They can help in the following ways:

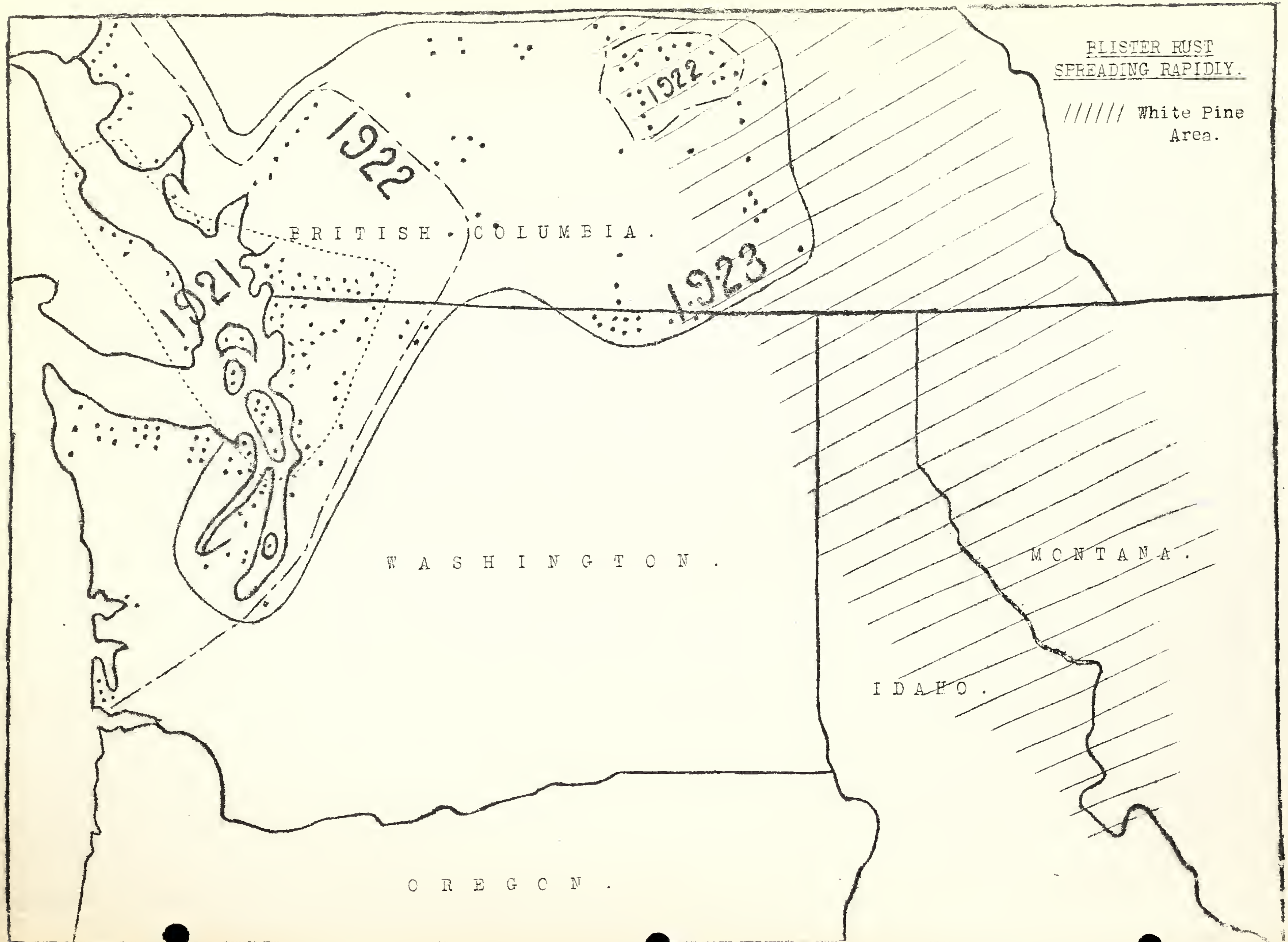
1. By destroying any cultivated black currants which they may have in their gardens.

2. By helping to enforce the quarantine laws listed above.

3. By watching for the disease, as described here, on currants, gooseberries, or white pines. If anything suspicious is found, send it to your State Department of Agriculture, or the Office of Blister Rust Control, 618 Realty Bldg., Spokane, Washington.

For further information apply to State Forester, Sacramento, California; State Department of Agriculture, Sacramento, California; or S. N. Wyckoff, 618 Realty Building, Spokane, Washington.

Issued by Office of Blister Rust Control,
Bureau of Plant Industry,
U. S. Department of Agriculture.
September - 1924.


BLISTER RUST
SPREADING RAPIDLY.
////// White Pine
Area.
1922
1922
1921
1923
BRITISH COLUMBIA.
WASHINGTON.
MONTANA.
IDAHO.
OREGON.

Scouting for the Disease

Bearing in mind the importance of finding the disease if present, a careful inspection of the black currant plantings was made. These bushes are extremely good indicators of the presence of the rust. Wild currants and gooseberries were inspected here and there throughout the eradication area as well as many sugar pines. No sign of the disease was found on either host plant.

Nursery Inspection

The importance of the nurseries as a source of supply of black currants is of course obvious. They were inspected for Blister Rust hosts in conjunction with the eradication work. In order to find the status of each nursery in the State a form letter was sent to all as follows:

UNITED STATES DEPARTMENT OF AGRICULTURE
Burueau of Plant Industry

Sacramento, Caifornia

Dear Sir:

The renewal of active work in this state on White Pine Blister Rust Control, took definite form when a cooperative agreement was made among the State Department of Agriculture, the State Board of Forestry and the U. S. Bureau of Plant Industry, calling for the eradication of the cultivated English black currant (Ribes Nigrum) in California. Field work was started in northern California on August 15 and over a period covering two months, six counties have been scouted and the black currants removed. It is one of the first measures employed to retard the possible entry of the White Pine Blister Rust into California. A general program of eradication of these bushes is being conducted in the western pine growing states. It is a tremendous job but it can be done.

You will doubtless remember that during the summer of 1922, the nurserymen of California were asked for information concerning the number of cultivated English black currants in their possession. An admirable response was at that time received and much valuable information was obtained. A lapse of two years time must necessarily bring many changes or corrections.

I am enclosing herewith an addressed postcard which we should like to have you fill out and return. No postage is required. This information concerning the cultivated black currants in your nursery will be of great value to us. Even if you have none of

these plants in stock please fill out the card and mail to us.

Many nurserymen in California have already destroyed their black currants. Will you not do the same? The nurseries of Idaho, Washington and Oregon have destroyed all their cultivated black currant bushes. The black currants destroyed by nurseries of the latter State alone total about 16,000.

Because of its tremendous values in present and potential sugar pine timber, California has really more at stake than Oregon or Washington. The destruction of your bushes will constitute active cooperation on your part in the struggle to protect and perpetuate the sugar pine forests of California.

Thanking you for whatever information you may send I am,

Very truly yours,

(Signed) George A. Root,

Assistant Pathologist

Much desirable information can be obtained in this way. Already a good response has been made and several of the nurseries have destroyed their black currants. Indications point to a small percentage of the nurseries possessing these bushes. It is hoped that a personal visit can be made to many of them as the work progresses to other counties.

Summary

Black currants were eradicated in nearly seven counties. The total number of plantings found was 226, consisting of 1621 bushes. Considering the area covered and the number of bushes removed it can be seen that the public in general took a favorable attitude toward our working policy. An inspection of these bushes throughout the northern part of the State revealed no signs of the Rust.

Future Plans and Work

Attending the success of the first season's work of eradication it has seemed advisable to include a much larger territory for the season of 1925. It is proposed that the eradication work be carried on in the following twelve counties: Mendocino, Lake, Tehama, Glenn, Colusa, Sutter, Butte, Plumas, Yuba, Sierra, Nevada and Placer and in as many more as time and finances will permit. With the completion of such an area practically one third

of the State will be covered. (See map at end of Report).

A Black Currant Prohibitory Law

A State law requiring the removal and non-propagation of the cultivated English black currants will in all probability be introduced into the next Legislature. Such laws are now in force in Idaho and Oregon. It seems desirable to have such a Statute. It makes it possible to remove all plantings of black currants. In several instances, owners of these bushes have withheld their removal pending a law compelling them to do so. In most cases, however, the best results can be obtained by assuming that the owners can be of service to the work by the voluntary removal of their bushes.

A Sugar Pine Study

Plans are being considered to have the U. S. Forest Service and the Forestry Department of the University of California make a study of sugar pine reproduction with special attention to the number and species of wild currants and gooseberries growing in the area. This phase of the work is essential in that it will enable one to more successfully combat the disease should it happen to become established in sugar pine regions.

General Notes

The field work in the eradication of the cultivated English black currants terminated in Humboldt County on December 20. This ended the field season for 1924.

The number of bushes found from December 1 to 20 is as follows:

No. Plantings eradicated---104

No. Bushes eradicated-------755

No. Plantings not eradicated--4

No. Bushes not eradicated---24

The total then found is 108 plantings comprising 779 bushes.

Criticisms of the Blister Rust Film

Three of the four scouts in California this past season had no particular criticism to make. Mr. Henry suggested that the film could be improved by definitely stating where the disease is located on the Ribes bushes. The only indication that the spectator has of this is the few moments in the picture where the Federal agent shows the underside of the leaves to the owner of the bushes. A close-up of a diseased Ribes leaf showing the uredinia and telia on the underside would clarify the doubt now existing as to the part played by the Ribes host. The diseased pine twig is shown, why not the Ribes leaf?

Disinterested parties have pointed out that the scenic views as an introduction are too long, i.e.. too much of the picture is devoted to scenery. This may be true to the audiences of California.

The writer has no particular criticism to make exdept that he corroborates Mr. Henry's regarding the introduction of a diseased Ribes leaf.

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July 1, 1917

A.HOEN & CO. BALTO.

1.2 Inspection of Transported Host Plants in Cooperation with the Federal Horticultural Board

Inspection work during the spring of 1924 extended over the period of March and April, the exact period of inspection at each point being shown in the table showing the plant shipments inspected. One inspector was located at each of the following points: Portland and Pendleton, Oregon, Pasco, Seattle and Tacoma, Washington. Two inspectors were located at Spokane. The table entitled "Plant Shipments Inspected" gives the summary of the plant shipments which were inspected and the violations that were found at each inspection point. This table is followed by detailed tables showing the plant shipments that were inspected at each inspection point each day.

The table entitled "Quarantine Violations" gives an analysis of all violations which were interupted by our inspectors as well as those reported from other sources.

Plant Shipments Inspected - Spring 1924.

Inspection Point	Period of Inspection	Number From: Eastern Quar. Zone	Number From: Western Quar. Zone	Number From: Not Quar. Zone	Number Inspected	Number Not Inspected	Number of Violations: State	Number of Violations: Federal	Number Shipments Reported to States	Number Without Inspection Tag
PARCEL POST										
Portland	3/3 to 5/2	184	321	133	619			3	615	13
Pendleton	3/3 to 5/1	137	497	434	1,066			1	636	41
Pasco	3/3 to 5/3	82	1,316	64	1,396	65		1	372	26
Seattle	3/8 to 4/30	649	1,019	450	1,682	443	5	8	1	
Sookane	3/3 to 5/5	5,464	1,056	711	7,213		1		95	43
Tacoma	3/4 to 4/30	170	337	138	641		2	2	263	53
Total		6,686	4,546	1,930	12,617	508	8	15	1,982	176
EXPRESS										
Portland	3/3 to 5/2	302	263	291	862				845	10
Pendleton	3/3 to 5/1	136	189	445	772	12		1	449	16
Pasco	3/3 to 5/3	168	397	417	940	12		1	422	20
Seattle	3/8 to 4/30	324	439	552	630	427		1		
Spokane	3/3 to 5/5	276	772	387	1,427		1	1	739	39
Tacoma	3/4 to 4/30	34	85	82	172	1	1		48	11
Total		1,240	2,145	2,174	4,803	452	2	4	2,503	96
FREIGHT										
Portland	3/3 to 5/2	8	27	53	91				91	
Pendleton	3/3 to 5/1		7	25	32				16	
Pasco	3/3 to 5/3	3	67	85	102	50			48	2
Seattle	3/8 to 4/30		16	15	14	1				
Sookane	3/3 to 5/5	23	175	182	333	47			284	6
Tacoma	3/4 to 4/30		11		10				10	
Total		34	303	360	582	98			449	8

QUARANTINE VIOLATIONS
SPRING - 1924

Shipper	Transporting Agency	Federal Quarantine No. 26						Federal Quarantine No. 54						State Quarantines Nos. 7 - 12 - 13					
		Black Currants		Other Ribes		White Pine		Black Currants		Other Ribes		White Pine		Black Currants		Other Ribes		White Pine	
		No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations*	No. Plants	No. Violations	No. Plants
Nursery	Parcel																		
	Post			1	1					2	9					4	13		
	Express									2	6								
	Freight																		
	Unknown			1	1														
Individual	Parcel																		
	Post			1	6					12	52	4	10			4	4		
	Express									3	5			*0	4	*2	9		
	Freight																		
	Unknown																		
Total				3 -	8					19 -	72	4 -	10	0 -	4	10 -	26		

*Black currants and other Ribes in one violation

Violations Federal Quarantine #54 = 23
" " " #26 = 3
" State Quarantines #7,12,13 = 10
Total 36

Ribes Shipments = 32 of 110 plants
Pine " = 4 of 10 "

Report on inspection in Mail Cars of Nursery
Stock Travelling by Parcel Post

As the inspection work has developed some inspection work in mail cars has been done. This work has been of two types: First, inspection in mail cars that were at their initial point or at their destination and were being loaded or unloaded, Second, inspection in messenger cars which were passing through an inspection point.

According to the letter of Feb. 14, 1921, of the Postmaster General "Packages in through cars or in mail bags which are not opened in the terminal railway post offices cannot be inspected". This instruction on the limitation of our inspection work has been carefully observed.

In the inspection of nursery stock in cars that were being loaded or unloaded at the railway mail terminal we have been following this policy ever since quarantine work was established and this situation appears to be covered in the general letter of instructions of the Postmaster General of Feb. 14, 1921.

One place of our inspection work does not seem to have been clearly authorized by any instructions thus far, that is inspection in the messenger cars of trains which are passing through a station. No attempt has been made to do inspection work of this kind except upon the solicitation of the mail clerks. Our inspectors have made it a practice to ask the messenger clerks if they had any nursery stock in their car. Sometimes these clerks in a spirit of cooperation have handed our inspector packages for examination or if the mail clerk was busy, invited our inspector to come into the car and look around. All of the officials have indicated that we ought to inspect this material if we were really serious in our intention, and wished to examine all shipments. The spirit of cooperation has been such that we could hardly refuse it even though our instructions have not specifically covered the case, neither have we had any instructions from the post office forbidding such inspection. Wherever there has been no offer of cooperation by the clerks in the messenger cars we have not boarded them for inspection. However we have received such general cooperation in this matter that in only a few cases are the messenger cars not inspected. Consequently thus far we have had no need for special authorization to cover this class of inspection.

After your request for a special report regarding this matter I asked each inspector to report on the amount of such inspection at his post, and what suggestions he had to offer. I am concluding this report with a copy of the report of each inspector so that you can have their ideas regarding this phase of the work.

Entering Mail Trains for Inspection Purposes, Spokane, Wash.

The mail cars of the following trains are actually boarded for inspection purposes:

G.N. 39	O.W. 12	O.W. 77	N.P. 3
N.P. 42	O.W. 85	C.M. 18	G.N. 2
G.N.256	C.M. 15	N.P.311	N.P. 4
N.P. 1	N.P.314	G.N. 27	C.M.16
O.W. 11	N.P. 2		

The amount of parcel post material made available for inspection in this way is approximately 50% of the total inspected at trains, but is only a small percentage (Probably less than 5%) of the grand total; for the great majority of shipments inspected are found in the Railway Mail Terminal and the City Post Office.

It is necessary to make these inspections aboard trains in order to inspect shipments orginating from and consigned to points where there is no inspector. It also greatly facilitates the inspection of trains that are made up here or whose run terminates at this point.

It seems impracticable to me to make train inspections without boarding the mail cars, because the mail clerks will often invite the inspector to "come in and look around", and if he refuses they (the mail clerks) feel that her is not sufficiently interested in the performance of his duty and this will tend to destroy their cooperative spirit.

There are two evident alternatives: (1) to obtain best results, the inspectors should have the authority to board mail cars for the inspection of loose nursery stock in transit. (2) A fairly good degree of efficiency could be obtained by omitting the train inspections and emphasizing regular inspections at the depot mail and express rooms at such intervals as the train schedules require. This second method would take care of everything except such shipments as are both from and to points served by the same train and at neither of which an inspector is stationed.

Entering Mail Trains for Inspection Purposes, Seattle, Wash.

The following trains are the ones on which I enter mail cars:

N. P. # 333	G. N. # 3
N. P. # 1	N. P. # 3
N. P. # 41	

Entering Mail Trains for Inspection Purposes, Spokane, Wash.

The mail cars of the following trains are actually boarded for inspection purposes:

G.N. 39	O.W. 12	O.W. 77	N.P. 3
G.N. 42	O.W. 35	G.N. 13	G.N. 2
G.N.256	O.W. 15	N.P.311	N.P. 4
N.P. 1	N.P.314	G.N. 27	O.W.16
O.W. 11	N.P. 2		

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Entering Mail Trains for Inspection Purposes, Seattle, Wash.

The following trains are the ones on which I enter mail cars:

N. P. # 332	G. N. # 3
N. P. # 1	N. P. # 5
N. P. # 41	

I have had invitations to enter all of these trains. Recently G.N. #357 has carried many bundles of Christmas trees, and I have been invited, by the clerk, to enter the mail car and look over the shipments.

Nothing remains in mail or express cars and goes through to other points beyond Seattle, because the cars are completely unloaded here. The only reason why I have appreciated the chance to enter mail cars, was because I could make a quick survey of the nursery stock being carried, and did not have to wait while the train was being unloaded. The trains carrying the most nursery stock arrived early in the morning and in ten minute intervals. Due to the shortage of track space the trains are moved away before they are emptied of their mail and express. The mail and express cars are then moved to the milk shed which is far enough away from the depot to make it very inconvenient for the inspector to watch the final unloading of them and at the same time keep watch on the other incoming trains.

I can easily see how it would make the work much more efficient, if an inspector who is stationed at a point where the cars are not completely unloaded, could enter mail cars and examine plant material which is to be unloaded between his station and the next inspection point.

I have noticed that the mail clerks usually keep the nursery stock out from under the piles of mail sacks, and that, if the inspectors had authority or permission to enter the mail cars, they could, after acquainting themselves with the systems employed by the clerks in sorting quickly examine the shipments which would be missed otherwise. I found that I could do this without being in the way at all.

Note: I have learned since writing to you before that no trains carry any kind of mail or express beyond Seattle without its having been unloaded here.

Entering Mail Cars for Inspection Purposes, Pasco, Wash.

Northern Pacific Main Line

Train	Direction	Time	From	To
No. 42	East Bound	2:20A. M.	Seattle	Kansas City
" 4	" "	3:20 "	"	Chicago
" 334	" "	11:05 "	"	Spokane
" 3	West "	11:20 "	Chicago	Seattle
" 2	East "	5:40P. M.	Seattle	Chicago
" 333	West "	6:45 "	Spokane	Seattle
" 1	" "	9:20 "	Chicago	"
" 41	" "	10:55 "	Kansas City	"

Northern Pacific Branch Lines

Train	Direction	Time	From	To
No. 347		4:00A.M.	Pasco	Walla Walla
" 352		10:40 "	Walla Walla	Pasco
" 349		11:40 "	Pasco	Pendleton
" 351		11:50 "	Pasco	Walla Walla
" 350		5:30P.M.	Pendleton	Pasco
" 348		10:00 "	Walla Walla	Pasco

Spokane, Portland & Seattle Railway

No. 3	West Bound	12:10A.M.	Spokane	Portland
" 2	East "	2:20 "	Portland	Spokane
" 1	West "	12:05P.M.	Spokane	Portland
" 4	East "	4:20 "	Portland	Spokane

Other Inspection Points

Place	Time
Post Office	5:55 P.M.
Freight Office	10:15 A.M.
" "	8:50 P.M.

Mail Cars which I enter

N. P. #4	at 3:20 A.M.	N. P. #3	at 11:20 A.M.
N. P. 2	at 5:30 P. M.	N. P. 1	at 9:20 P.M.
N. P. 347	at 4:00 A.M.	N. P. 348	at 10:00 P.M.
S.P.S. 3	at 12:10 A.M.	S.P.S. 2	at 2:20 A.M.
S.P.S. 1	at 12:05 P.M.	S.P.S. 4	at 4:20 P.M.

Most of the mail clerks on the above trains have what loose parcels they have ready to hand out to me when they come in so that I can look at them while they unload the pouches. I always go into the blind end of these cars. Approximately three-fourths of the parcel post inspected here is done thru this method.

If we are not allowed to inspect parcel post in mail cars we might as well quit. For instance a person living at Centralia, or any place along the line where there is no inspector, could send a package of contraband plants to some place in Idaho, Hope, Idaho, for instance, and we would never know about it unless we are allowed to enter mail cars. Or a package could be placed on N. P. No. 1 at some point in Illinois and come clear out here to Kent, Wash. without ever being taken off the car.

I believe a letter from the Postmaster General authorizing as to entering mail cars or instructing mail clerks to hand the loose parcels apparently containing nursery stock out to us would solve it. Of course it would not be practical to hand out the parcels if there are very many of them, but when there are only a few this system works very well.

Northern Pacific Branch Lines

Train	Direction	Time	From	To
No. 347		4:00A.M.	Pasco	Walla Walla
" 352		10:40 "	Walla Walla	Pasco
" 349		11:40 "	Pasco	Pendleton
" 351		11:50 "	Pasco	Walla Walla
" 350		5:30P.M.	Pendleton	Pasco
" 348		10:00 "	Walla Walla	Pasco

Spokane, Portland & Seattle Railway

No. 3	West Bound	12:10A.M.	Spokane	Portland
" 2	East "	2:20 "	Portland	Spokane
" 1	West "	12:05P.M.	Spokane	Portland
" 4	East "	4:20 "	Portland	Spokane

Other Inspection Points

Place	Time
Post Office	5:55 P.M.
Freight Office	10:15 A.M.
" "	6:50 P.M.

Mail Cars which I enter

N. P. #4	at 3:20 A.M.	N. P. [illegible]	at 11:20 A.M.
N. P. 2	at 5:30 P. M.	N. P. 1	at 9:20 P.M.
N. P. 347	at 4:00 A.M.	N. P. 348	at 10:00 P.M.
S.P.S. 3	at 12:10 A.M.	S.P.S. 2	at 2:20 A.M.
S.P.S. 1	at 12:05 P.M.	S.P.S. 4	at 4:20 P.M.

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Entering Mail Cars for Inspection Purposes, Tacoma, Wash.

As I interpret our instructions on Page 2 we have no right to enter mail cars. For this reason I have not done so. As mail robberies have been numerous at times and postal employees are armed I do not believe it to be a good plan, though I am perfectly willing to do so. The best method I know of is to ask the mail clerk on duty at the R. R. station to pass out any shipments there may be in the car for inspection. As I am acquainted with them they do it willingly while they are loading and unloading the mail car. However, as the only shipments I find in that way here are a few certified ones from Washington Nursery Co., to California points it is not a very important matter at Tacoma. I believe we can secure as good results without actually entering any mail cars under most circumstances.

Entering Mail Cars for Inspection Purposes, Pendleton, Ore.

Trains No. 78, 1, 141, 349, 17, 2, and 77. These are the trains in which I enter the mail cars. Trains No. 24 and 18, the mail cars are seldom entered.

By entering the mail cars, it enables me to inspect almost all of the shipments which remain on the cars and which otherwise could not be inspected here. Roughly guessing I would say that, about one-third as much nursery stock passes through here in the mail cars, as is taken off.

I believe the inspector should be granted authority to inspect loose nursery stock packages in the mail cars, for the following reasons:

A. If careful he would not in any way hinder the work of the men in charge of the car or cars.

B. He could inspect those packages that are taken off before the next inspection point is reached--thus cutting down the chances of a violation to pass uninspected. For instance; an incident that happened here last spring and related to me by the express agent (Mr. Kline) clearly shows why the authority in question should be granted. A shipment of white pine, via express, from a small town in Pennsylvania to Pomeroy, Wash., was caught by the inspector at this place. It was a federal violation and if the shipment had been by parcel post instead of express, the violation would not have been detected, as it would have been in the mail car and unloaded at a place where there was no inspector.

By not having authority in regard to entering mail cars, it is readily seen that shippers can easily avoid the quarantine laws regarding the shipment of Ribes and five-needled pines, and in

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By not having authority in regard to entering mail cars, it is readily seen that shippers can easily avoid the quarantine laws regarding the shipment of ribes and five-needled pines, and in

this way keep inspection work below the standard which it could otherwise obtain. In my opinion the question is, "why have inspection work only about 60 or 70 percent efficient, when by granting the authority in question, the work could be made 100 percent efficient?"

The only solution I have to offer in regard to the situation is--that the postal authorities grant inspectors the right to enter cars, and inspect loose nursery stock packages. As stated before--that as long as the inspector in no way interferes (which is easily possible) with the work of the officials in charge, I see no reason why the authority would not be granted.

I know that by tactful cultivation of the friendship of the men in the mail cars, it is generally possible to enter the same, but it is certain that the same results can not be obtained in all cases, not as readily and easily as if the inspector would have the needed authority.

Entering Mail Cars for Inspection Purposes, Portland, Ore.

I enter the mail cars for inspection purposes on the following trains: U.P. No. 5, S.P.S. No. 3 and O.W.R.&N. No. 11. It is not absolutely necessary to enter these cars because of the fact that all mail is transferred in Portland. I enter the cars only to speed up the work and make sure that no shipments are missed while I am working another train. In case of the trains I have mentioned there are always one or more cars of mail besides the regular mail car. These are the cars I enter. I do not enter the regular mail car while the crew is working because the car is generally crowded.

The inspectors at points where all mail is not transferred from the trains (Points such as Pasco and Pendleton) should have authority to enter the mail cars for inspection purposes. In this way shipments that are dropped before another inspection point is reached, will be taken care of. If the inspector's are not allowed to enter the mail cars small parcel post shipments will sometime reach their destination without ever having been inspected by a quarantine inspector.

I would suggest that all mail clerks be asked to place loose parcel post shipments in such a place as to enable the inspector to find them readily on entering the car. I think, too, that most mail clerks would be very willing to cooperate in this manner. The nursery stock shipments could be placed on top of the different piles of mail sacks without inconveniencing the mail clerks in the least.

Report on Quarantine Inspection Work Fall--1924

Inspection work during the fall of 1924 extended through the months of October, November and December, the exact period of inspection at each point being shown in the table showing the plant shipments inspected. Our inspectors were located at each of the following points: Portland and Pendleton, Oregon; Pasco, Seattle, Spokane and Tacoma, Washington.

The tables with this report give a summary of the inspection work done and the results of the work.

QUARANTINE VIOLATIONS
FALL - 1924

Shipper	Transporting Agency	Federal Quarantine No. 26						Federal Quarantine No. 54						State Quarantines Nos. 7- 12- 13					
		Black Currants		Other Ribes		White Pine		Black Currants		Other Ribes		White Pine		Black Currants		Other Ribes		White Pine	
		No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants	No. Violations	No. Plants
Nursery	Parcel Post																		
	Express									1	1								
	Freight																		
	Unknown																		
Individual	Parcel Post									2	32	4	5			2	22	4	46
	Express									1	8								
	Freight																		
	Unknown																		
Total										4 - 41		4 - 5				2 - 22		4 - 46	

Violations Federal Quarantine #54 = 8 (5 pines)
" " " #26 = 0
" State Quars.#7,12,13 = 6

Ribes Shipments = 6 of 63 plants
Pine " = 8 of 51 "

No.Tag = 13
? = 1
Tag = 0

Plant Shipments Inspected - Fall 1924.

Inspection Point	Period of Inspection	Number From Eastern Quar. Zone	Number From Western Quar. Zone	Number From Not Quar. Zone	Number Inspected	Number Not Inspected	Number of Violations State	Number of Violations Federal	Number Shipments Reported to States	Number Loose Parcel Post
PARCEL POST										
Portland	10/11 to 12/22	48	510	52	606				604	446
Pendleton	10/22 to 11/28	4	2	23	29				6	
Pasco	10/10 to 11/30	11	56	23	90				19	88
Seattle	10/10 to 12/22	80	2,383	254	2,716	1	5	6	117	2,702
Spokane	10/15 to 11/29	109	179	123	691	10			40	199
Tacoma	10/14 to 11/29	29	637	90	756		1		221	663
	Total	281	3,767	565	4,888	11	6	6	1,007	4,098
EXPRESS										
Portland	10/11 to 12/22	115	267	70	437	10		1	436	
Pendleton	10/22 to 11/28	11	69	140	219	1			73	
Pasco	10/10 to 11/30	62	319	147	524	2			182	
Seattle	10/10 to 12/22	74	539	108	721	2			109	4
Spokane	10/15 to 11/29	58	201	55	299	11			37	
Tacoma	10/14 to 11/29	11	286	133	428	1		1	93	21
	Total	331	1,681	653	2,628	27		2	930	25
FREIGHT										
Portland	10/11 to 12/22	93	303	62	256	170			450	
Pendleton	10/22 to 11/28		6	11	16	1			3	
Pasco	10/10 to 11/30	1	33	41	60	15			31	
Seattle	10/10 to 12/22	2	18	11	32				32	22 cars
Spokane	10/15 to 11/29	2	15	26	31	11			17	
Tacoma	10/14 to 11/29		7		4	3			3	
	Total	98	382	131	399	200			536	22 cars

1.8 Sanitation of Nurseries

Inspection and sanitation of nurseries has been conducted by the men engaged in cultivated black currant eradication, and has been largely covered in their reports. The most extensive work of this type is now being carried on in California. This state contains a large number of nurseries, many of which carry a large variety of stock. Excellent progress is being made in finding out if these nurseries contain cultivated black currants but this is a large piece of work and may not be completed for some time.

So far as is known, no nurseries in Montana, Idaho, Washington or Oregon now contain any cultivated black currants.

1.9 Public Information and Cooperation in Delaying Spread of the Rust

This subproject covers all cooperative educational and publicity work conducted with the cultivated black currant eradication program. Such work consisted of brief talks before various organizations, numerous newspaper stories, giving the local status of the work, and the use of the western blister film. The following report covers in more detail the use of this film.

USE OF THE WESTERN BLISTER RUST FILM

* * * * *

In May, 1924, 5 copies of the western blister rust film, "Blister Rust--A Menace to Western Timber" were received by the Spokane Branch, Office of Blister Rust Control. These films were immediately assigned to the blister rust leaders in the 5 western states in which blister rust work is being actively conducted by this office, namely, Montana, Idaho, Washington, Oregon and California.

At the time that these films were issued to the state leaders, the following memorandum was sent to them, concerning their use:

MEMORANDUM TO STATE LEADERS:

The Spokane office now has five copies of the blister rust motion picture film "Blister Rust--A Menace to Western Timber". It is planned to allot one of these films to the State Leader in each of the states of California, Oregon, Washington, Idaho and Montana.

As State Leader, it will be incumbent upon you to make proper arrangements to have this film shown, and to see to it that it is kept in good repair.

These films are issued to us upon the conditions that we arrange to keep them busy. Each of you can use your copy of the film

1.8 Sanitation of Nurseries

Inspection and sanitation of nurseries has been conducted by the men engaged in cultivated black current eradication, and has been largely covered in their reports. The most extensive work of this type is now being carried on in California. This state contains a large number of nurseries, many of which carry a large variety of stock. Excellent progress is being made in finding out if these nurseries contain cultivated black currants but this is a large piece of work and may not be completed for some time.

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These films are issued to us upon the conditions that we arrange to keep them busy. Each of you can use your copy of the film

to good advantage in relation to your work. The following suggestions for its use probably do not cover all possibilities, but are merely indicative of what may be done:

1. Loan to Forestry Schools and Agricultural Colleges. All such institutions are anxious to show this film to their students.
2. Loan to secondary and grade schools. May be used to good advantage in relation to school campaigns or cultivated black currant work.
3. Loan to County Agents. Could be loaned upon request to county agents, through State Extension Leader. It is suggested that you discuss this matter quite fully with the State Extension Leader, making arrangements with him for the use of the film or any blister rust literature within his organization.
4. Show to scientific meetings, either special meetings, or at regular meetings of scientific organizations. For example, I recently showed this film to the Society of Associated Engineers, at Spokane, at one of their weekly noon-day meetings. The response was excellent.
5. Show at general public meetings, or at local theaters. Such use will be of special value in relation to your cultivated black currant eradication work. (See plan of work for cultivated black currant eradication as outlined at Spokane last December.) You will probably be able to have the film shown at local moving picture theaters in small towns where you are working. Please try this out. The use of the film will cost the theater manager nothing. He should be willing to include it in his program without any cost to us.
6. Loan to Forest Service officials.

I suggest that you immediately notify all organizations within your state that might be interested. Tell them you have this film and are willing to loan it to them. When a request comes in from an organization that you believe should show the film, send it to them by parcel post or express. The customary arrangement is for them to pay the return charges. Use your own discretion concerning this.

If you are making personal arrangements to show the film outside of the theater, you will have to secure the services of an operator with a portable projector. You will be able to find such an operator in most towns of fair size, by application to the local theater, film exchange, educational film bureau, high school, or store handling projecters and film supplies. Secure the cheapest rate possible from a competent operator. In Spokane I pay $3 for an afternoon meeting and $5 or $6 for an evening meeting, the operator supplying the projector and making all arrangements for the supply and hanging of a screen. It has been my experience that the film exchanges

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will charge much more than the other suggested sources.

In case of such an arrangement, be sure that you are observing the local fire ordinances in regard to films. There are special rules to cover this in most towns. The operator can probably inform you. These films are of the relatively non-inflammable type, called "slow-burning". If ignited, they generally burn for a short distance and then go out.

You will also be given the responsibility of keeping the film in a good state of repair. After each showing, a film must be re-wound, The operator will practically always do this for you, if you request him to do so. Instructions with the film, however, state that it is not to be re-wound. So you will probably often have it returned to you not re-wound. I suggest that you make arrangements at your headquarters with some one who will re-wind and splice the film for you, at a nominal charge.

A film is occasionally broken while being shown. In such a case, the operator repairs it temporarily by fastening it together, generally with a paper clip. It will then have to be spliced before showing again.

By examination of the film you will note that each of the small pictures (called "frames") has 4 perforations opposite it, on each margin. In splicing, it is of great importance that the film be so out and joined together that the spliced frame will have 4 such perforations on its margins. If this is not done, the film will show "out of frame", when this point is reached. This means that the reproduction will have the appearance of being set either too high or too low on the screen, necessitating adjustment by the operator. In making arrangements for splicing, be sure to insist that the work is properly done, in this regard. Also, mention to the repairer that these films are of the slow-burning type, necessitating the use of a special cement.

For your information, I am enclosing a small printed circular, giving directions for splicing. The use of a splicing block is recommended, as it does better work than the hand method.

This office desires a complete record concerning the number of times these films are shown, places shown, and response. I am sending you a supply of forms which will give us the necessary information. Please fill out, or have filled out, one of these forms after each showing of the film, and send it immediately to the Spokane office.

Finally, I wish to again remind you of the necessity of making arrangements to secure full use of these films, They were secured for us because of our statement that they were urgently needed and would greatly assist us in our work. If you allow them to be unused for any considerable periods we shall not be justified in their purchase.

Signed, Stephen N. Wyckoff

Attached is a copy of the special form issued by this office to be used in reporting the use of the film.

Copies of the forms as sent to this office by the state leaders are appended to this report. A summary of these is given in the following tabulation:

TABLE NO. VII

USE OF BLISTER RUST MOTION PICTURE FILM IN WEST

State	Number Places Shown	Number Times Shown	Total Spectators	Spectators Average per Times Shown
Montana	7	7	3370	481
Idaho	11	12	1980	165
Washington	11	13	2532	195
Oregon	6	12	1800	150
California	7	9	2650	294
Total	41	53	12332	233

Note: the figures given for attendance at several of the Oregon showings are estimated, as no information was given by the state leader.

All state leaders have reported these films to be of great value, first in general educational work on blister rust, and second, in securing the eradication of cultivated black currants. This is particularly true in those states which have no legislation against the cultivated black currant, where the eradication of these plants must be secured through the consent and cooperation of the owner. As cultivated black currant eradication progresses farther from the white pine forests, the use of these films will be even more necessary than before. It is therefore recommended that these 5 films be continued in use on the present basis.

Stephen N. Wyckoff
Associate Pathologist.

PROJECTS 2 and 3

DEVELOPMENT AND APPLICATION OF LOCAL CONTROL

During the field season of 1924, the Western Branch of the Office of Blister Rust Control conducted an experimental local control project on the Kaniksu National Forest, Idaho. This project was larger in scope than those undertaken in 1922 at Elk River, Idaho and in 1923, at the Priest River Experiment Station, Idaho.

Purpose of Work

The purposes of this project were:

1. To continue the experimentation on methods of local control suitable to western forest conditions.

2. To so decrease the cost of local control that it can be economically applied to the white pine type of the Inland Empire forests.

3. To develop a personnel trained for such work, to be available in the future as this work increases in volume.

4. To give actual protection to valuable white pine timber on a national forest, in a region directly threatened with invasion by blister rust.

Location of Work

The area finally chosen for this project was the Upper Priest River Vally, Kaniksu National Forest, Idaho. This area was chosen after due consideration had been given to several other possible areas, both by this Office and the officials of the Forest Service.

During the field season of 1923, preliminary and experimental reconnaissance had been conducted on 4 areas in the Kaniksu National Forest by this Office, and one area in the Pend Oreille National Forest and one area on the St. Joe National Forest by this Office in cooperation with the Forest Service. These areas were known as the Upper Priest River Area, the Pend Oreille River Area, the Sullivan Lake Area, the Salmon River Area, the Porthill Area and the St. Joe Area respectively. Complete reports concerning the work and conditions on these areas will be found in the Report of the Spokane Branch, Office of Blister Rust Control, February 1 to December 31, 1923, PP 293-325.

During the Spring of 1924, after the information on these areas had been completely assembled, a conference was held with the officials of the Forest Service, District One, Missoula Montana. The information concerning these areas was presented to them and

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agreement was made that the Office of Blister Rust Control should, during the summer of 1924 conduct a local control project, with funds which this Office had available for such a purpose, in the Upper Priest River Area.

Description of Area

Upper Priest River Area is situated in the extreme northwest corner of the State of Idaho, extends southward from the International Boundary, and is but from 3 to 4 miles east of the Washington State line.

The valley is narrow and steep sided. The altitude of the stream drops from 3600 feet at the International Boundary to 2700 feet at the south edge of the area. The valley floor seldom exceeds $\frac{1}{4}$ mile in width from which the valley sides rise steeply to altitudes of from 4000 to 7500 feet. Several tributary streams of small size join the main valley, entering from the east. These occupy lateral valleys of good proportions, which are comparable in topography to the main valley.

The area covered by eradication averages about $1\frac{1}{2}$ miles in width and is eight miles in length. It measures 7880 acres. The upper limits of the area range from 5000 to 5500 feet elevation.

Organization of Work

The actual work, as organized in the Upper Priest River Valley and adjacent territory consisted of five interconnected subprojects, all bearing on local control in its present experimental phase, but because of their experimental nature not all properly chargeable to the protection of the white pine on the area covered. These five subprojects are:

1. Control Reconnaissance: a preliminary survey of an area being considered for protection, to determine need of protection, conditions affecting working methods, and basis for estimate of costs.

2. Ribes eradication: the actual protectioh of the white pine timber, by removal of the Ribes.

3. Study of methods: a purely experimental subproject for the development of better and cheaper methods of Ribes eradication.

4. Ecological study: an experimental study to determine conditions of Ribes and white pine growth in the white pine types, to establish indices of practical value in Ribes eradication.

5. Experimental chemical eradication of Ribes: an experimental study to determine the feasibility and cost of Ribes eradication by the application of toxic chemicals.

These five subprojects constitute projects B. 1, 2, 3, and D. 1, 2, of the estimates in the ten-year program, fiscal year 1925. In the general financial report they are considered separately. Because of their practical inter-relation, as part of the general western experimental local control problem, they are here discussed together.

Personnel

The personnel employed upon these five subprojects consisted of the following:

1. Control Reconnaissance

1 Field Supervisor	$225	per month.
7 Recorders	$80-$125	" "
7 Helpers	$ 70	" "

(Note: 3 of the above helpers paid by the State of Idaho, for work on State Land)

2. Ribes eradication

1 Field Supervisor	$225	per month
2 Camp Bosses (Scouts)	$125	" "
4 Scouts	$80-$110	" "
7 Foremen	$80-$110	" "
35 Laborers	$70-$ 75	" "
2 Cooks	$85-$125	" "
2 Cooks Helpers	$60-$ 70	" "

3. Study of methods

1 Field Supervisor	$200	" "
1 Foreman	$110	" "
5 Laborers	$ 70	" "

4. Ecological Study

1 Field Assistant	$150	" "
2 Helpers	$ 70	" "

5. Chemical Eradication

1 Field Assistant	$150	" "
1 Helper	$ 70	" "

6. Supplies and Transportation

1 Warehouseman	$70-$110	" "
1 Roustabout	$ 70	" "

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5 Laborers	$ 70 " "

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5. Chemical Eradication

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1 Helper	$ 70 " "

6. Supplies and Transportation

1 Warehouseman	$70-$110 " "
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The duties of the several classes of positions were briefly as follows:

1. Field Supervisor: to apply all instructions received from the Spokane Office concerning the subproject of which he is in charge; to direct the work of all men on his subproject. He is responsible to the Spokane Office for carrying out the plans for his subproject, and to enable him to do so is empowered to alter details of these plans, subject to later approval by the Spokane Office, in order to meet changes in working conditions in the field, but not to change the objective of his subproject.

2. Camp Boss (Ribes eradication): he is responsible to his field supervisor for the completion of definite work as outlined by the field supervisor, and to carry out this work will plan the work of his crews and issue proper instructions to his scouts and foreman; to order such camp supplies as are carried in stock at the warehouse, in order to properly supply the commissary and general needs of his camp; to see that his camp is kept in proper sanitary and general cleanly condition, and to see that all general rules promulgated by the Spokane Office concerning sanitation, fire prevention, etc., are enforced; to keep all records of work performed by his camp in such shape that they will at all times be avail able to the field supervisors.

3. Scout (Ribes eradication): subject to general instructions from his camp boss, to outline and plainly mark the type boundaries as drawn up by the reconnaissance force; to direct the foremen to the boundaries of these types; and to conduct actual Ribes eradication on areas to be worked by scouts.

4. Foreman (Ribes eradication): acting under instructions from his camp boss, to direct the work of his crew in eradicating Ribes on the area assigned to him; to follow the method of work outlined to him by his camp boss, but during any day, while working without supervision; to use his discretion concerning any minor changes in working methods necessitated by varying conditions; to constantly check behind his crew, and by means of crew checks, his own checking work, and other means to keep the efficiency of his crew at the highest possible point.

5. Recorder(Reconnaissance): to carry out, with the assistance of his helper, such reconnaissance work as is assigned to him by his field supervisor; to keep his field notes and records in such shape that they will at all times be ready for inspection and for use by the Ribes eradication force.

6. Warehouseman (General): to assume entire responsibility for the safety and proper delivery at the several camps of all supplies and equipment, from the time that such material leaves Coolin, Idaho, until delivered to the camps; to keep on hand at the warehouse

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6. Warehouseman (General): to assume entire responsibility for the safety and proper delivery at the several camps of all supplies and equipment, from the time that such material leaves Coolin, Idaho, until delivered to the camps; to keep on hand at the warehouse

a proper stock of such supplies and equipment in order to fill all reasonable needs for the work; to fill all requisitions for standard supplies and equipment that are presented to him in proper form by any persons authorized to order such material; to keep complete records of all such transactions with the several field units, properly charging each unit with the material it has received.

The above constitute the general instructions given to the men in the field by the Spokane office. It is also the duty of the Spokane office, to give all such general and specific supervision as is needed for the proper completion of the work; to issue instructions only to the field supervisors, field assistants, or warehousemen, such instructions to be given by these men to those working under them; to order and ship supplies as requisitioned by the warehouseman and to assume responsibility for their proper and immediate delivery to Coolin, Idaho.

B. Purchase and Transportation of Supplies.

Materials used during the field season on the several sub-projects of local control consisted in general of the following classes:

1. Instruments: Abney levels, compasses, chains, diameter tapes and aneroid barometers.

Such instruments were either requisitioned from Washington, or were purchased locally, in cases justified by the lowest local price obtainable.

2. Camp equipment and general tools: tents, bedding, stoves, cooking utensils and dishes, Ribes eradication tools, general camp tools and fire fighting equipment. Much of this equipment was purchased from the Forest Service, through their purchasing agent at Missoula. 500 single, wool, olive drab blankets were obtained from the War Department by payment of freight on their shipment from Fort Sill, Oklahoma. Ribes eradication tools were obtained from the Washington office.

3. Foodstuffs: all food and expendable camp supplies needed in the field. These were mostly obtained, by arrangement with the Forest Service, through their warehouse and central purchasing depot at Spokane. Small quantities of perishable foodstuffs, such as bread and meat, were purchased from local merchants at Priest River, Idaho.

The greatest bulk of material to be tranported to the camps, consisting of the foodstuffs, came from Spokane. For the transportation of supplies and men from Spokane to the camps, the following contracts were made: Priest River Transportation Co., for transportation by

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auto truck from Spokane to Coolin, Idaho, rate 1 cent per pound. Distance 84 miles. For transportation by auto truck from Priest river, Idaho, to Coolin, Idaho rate 3/4 cents per pound. Distance 26 miles. For transportation of men from Priest River to Coolin, $1.50 per man fro 10 or more in party. $2.00 per man for less than 10.

S. T. Byars: for transportation of supplies from Coolin to the camps, rate 2 1/2 cents per pound. Distance 26 miles by boat, 11 to 14 miles by pack horse. For transportation of men from Coolin to the warehouse, rate $1.50 per man, distance 26 miles by boat.

Methods of Work

A (2.12 and 3.12) Reconnaissance

Control reconnaissance consists of a preliminary study of an area under consideration for Ribes eradication to determine:

1. Location and extent of areas bearing sufficient white pine to justify protection, and age-class of the timber on these areas.

2. Location and extent of eradication working types.

3. Factors influencing cost of eradication, such as abundance of Ribes, topography, brush, coniferous reproduction, windfall etc.

The value of control reconnaissance depends upon the scope and accuracy of the graphic and statistical picture of the area which is obtained from it, to be used as a basis for judgement as to whether the pine on the area justifies protection and for definite and detailed plans for the protection work. Since all western local control work has thus far been conducted on the basis of watershed units rather than land office subdivisions, it is necessary to include in such a picture the topographic features of the valley, the course and length of the main and all tributary streams, the location and extent of the different timber types and amount of timber and age-class, location and nature of any small areas representing particularly difficult working conditions, such as rock formations, windfall, etc., and location and extent of each eradication type.

During the course of the 1924 field season, 7 eradication types were recognized, defined, and the cheapest and most efficient method of Ribes eradication sought for each type. An eradication type consists of an area on which conditions are sufficiently uniform, and sufficiently differentiated from the conditions on contiguous areas, to be readily delimited and worked by a special method best adapted to those conditions. The types recognized were as follows:

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J. H. Byers: For transportation of supplies from Coolin to the camps, rate 2 1/2 cents per pound. Distance 26 miles by boat, 11 to 14 miles by pack horse. For transportation of men from Coolin to the warehouse, rate $1.50 per man, distance 25 miles by boat.

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Definition of Types

1. <u>Creek type</u>: a strip, along a stream varying in width, representing an opening in the timber stands, and bearing growth of shrubby vegetation, consisting usually of Alnus, Salix, Acer, Rubus, and Ribes. Average Ribes per acre, 150 to 800.

2. <u>Ribes free type</u>: Areas of overmature, mature, or dense pole timber stands in which Ribes, together with other such shrubby vegetation have been mostly shaded out. Forest floor park-like in character, devoid of green vegetation, except in small isolated spots. Average Ribes per acre, 0 to 25.

3. <u>Brush or reproduction uniforms</u>: an area in which brush or reproduction have a fairly uniform but sparse distribution. Average Ribes per acre, 25 to 200.

4. <u>Brush or reproduction patchy</u>: an area in which brush or reproduction occur in dense patches, separated by clearings, or in which clearings occur in a general brush or reproduction cover. Average Ribes per acre, 25 to 100.

5. <u>Thicket</u>: an area which is uniformly covered with a very dense stand of coniferous reproduction, except where local irregularities in topography, rock outcrops, springs and seeps, etc., cause small brushy clearings, average Ribes per acre, 5 to 25.

6. <u>Age burn</u> (____year burn): an area recently burned, in which there is as yet no coniferous reproduction above the seedling stage, but dense brush and many Ribes. Average Ribes per acres, 500. Age of burn to be determined and designated by reconnaissance crews.

7. <u>Rock type</u>: an area which is predominantly rock, either in the form of outcrop, slides, cliffs, or ledges. These rocky patches may occur in any timber age class causing openings where very little vegetation exists. Many Ribes are found, particularly at the base of rock formations. Average Ribes per acre, 50 to 250.

The actual methods of work evolved to give the requisit information are here given. All bearings were taken by compass, and all distances by pacing.

1. Primary or Base Reconnaissance

A--Traverses: the main streams in the drainage to be reconnaissanced were traversed and data taken as follows:

1. Direction of flow of main stream
2. Intersection and direction of flow of tributary streams.
3. Timber age class limits, and eradication type limits.

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so far as could be seen from the traverse.

4. Location, elevation and direction of all vertical strips, situated so as to describe every timber age class. All data necessary to starting a strip was blazed on a tree on the strip near the stream. These vertical strips were placed 1/4 mile apart in mature timber, and not more than 1/2 mile apart on large burns.

   The traverses were then plotted to scale.

B--Sketching

1. Topography. From a vantage point on each side of the valley, the topography of the opposite side was roughly sketched in on the previously prepared traverse.

2. Timber age class. From the same vantage point, the limits of uniform timber age classes were indicated on the map.

   Wherever possible, this field sketching was done at a point on a vertical strip.

11. Secondary, or Detail Reconnaissance

A--Vertical strip

Strips at right angles to the main stream flow were run, the location of each having been determined as described above.

1. The accompanying form shows the data taken.

2. In addition to the above data, a column was added giving the eradication type.

3. The starting points of the horizontal strips were located on the vertical strips, so situated as to describe the area on each side of the vertical strip.

B--Horizontal strip

Strips at right angles to the vertical strips were run, located as described above. Regular reconnaissance data were taken, except that of timber data only timber age class was recorded. The following is the form used in taking reconnaissance data in the field.

CONTROL RECONNAISSANCE

Watershed Strip No. Recorder Linemen

R. LACUSTRE				R. VISCOSS				G. INERMIS								VISIBILITY	WHITE PINE					MIXED					PERCENTAGE									WIND-FALL	
																	MATURE	POLES		REPROD.		MATURE	POLES		REPROD.		W	CEDAR	D		Y	L	W	HEM.	SPRUCE		
1	10	50	UP	1	10	50	UP	1	10	50	UP	1	10	50	UP		D.B.H. & No. LOGS	No.	AV. AGE	No.	AV. AGE	D.B.H. & No. LOGS	No.	AV. AGE	No.	AV. AGE	P		F	L	P	P	F			HT.	DEN.

CONTROL RECONNAISSANCE

Date , 192 Course Degrees

BRUSH			ROCK	T. R. SEC.	ALTITUDE	NOTES
DOMINANT SPECIES	HT	DEN		TOPOGRAPHY		

The data obtained from reconnaissance was prepared in map form in the field, and then, as needed, these maps and the original data sheets were turned over to the Ribes eradication force for use in planning such work.

B (2.22 and 3.22) Ribes Eradication

The data received from the reconnaissance force constituted the basis for the Ribes eradication. The field supervisor of this latter project first divided the area into proper working units for the two camps, and in conference with each camp foreman and the scouts, the area for each camp was further divided into blocks, or crew working units. The camp units were based upon accessibility to the most favorable camp sites, in order to reduce to a minimum the distance of walking to and from work. The blocks were coincident with eradication type boundaries wherever possible, but in many cases it was found necessary to have the blocks include more than one eradication type.

The records were then given to the scouts, for use in marking the actual boundaries on the ground. The two scouts assigned to each camp unit were responsible for having each eradication type boundary, each block boundary, where these two did not coincide, and the upper working limit boundary plainly marked, for actually showing the several foremen these boundaries, and for the actual Ribes eradication in the Ribes free type.

With the exception of type 2, all the area was covered by eradication crews, each consisting of 5 laborers and a foreman. Each eradication type necessitated a modification of working method. Subject to minor changes because of slight variations in conditions the following methods were used on each of these types:

Type 1. Creek Type: crew works with an average interval of 6 feet, working parallel with stream, or across the contours. Stream used as starting line for first strip on each side.

Type 2. Ribes free Type: worked by scouts, usually in pairs, with an interval of 50 to 150 feet, depending upon age-class of timber. Scouts watch for patches of green vegetation caused by openings in the canopy, and which may contain Ribes.

Type 3. Brush or reproduction uniform: crew works with interval of 6 to 30 feet, according to density and character of cover, looking for Ribes, which are scattered promiscuously.

Type 4. Brush or reproduction patchy: crew works with interval of 20 to 50 feet, according to density and character of cover, looking for clearings, in which Ribes are apt to occur.

Type 5. Thicket: crew works with interval of 75 to 150 feet, according to density of cover, locating clearings where Ribes may occur. These clearings are carefully worked. Any large clearings are marked, and worked by scouts.

Type 6. Age burn: crew works with interval of 6 to 30 feet, depending on density of brush, which is dependent on age of burn. Careful search necessary to find Ribes, which are apt to be numerous.

Results of Work

A. Eradication

The field season was opened on June 16, when an advance party of men went to the Upper Priest River Area to prepare camps and move in supplies. On June 18, a party of men, consisting of reconnaissance recorders, crew foremen, scouts, and educational men went to the area for preliminary training. On July 1, men constituting the crewmen went to the area.

Of the entire field force of men permanently on the ground for Ribes eradication only seven had had any previous experience in this work. It was therefore necessary to put the entire force thru a period of training. This training period extended from June 20 (the date upon which the work actually started in the field) to July 12. The period June 20 to July 1 was devoted to training the recorders, foremen, scouts and educational men; the period July 1 to July 12 represents the training of the crew men.

The work during the training period consisted of regular crew work, differing only from the later work in that a slower pace was used and the men were spaced 6 feet apart, even on ground where normally the spacing would have been greater. This close interval was used in order to permit the foreman to very carefully check the work of each man in his crew.

The work for the period July 13 to July 26 is considered as an experimental period. During this period the ground to be covered was intensively studied, and the eradication types given above were recognized and defined. Eradication crews were put to work, on an entirely experimental basis, on each eradication type, to tentatively determine the most efficient and cheapest method of working each type. This experimental work was generally organized as follows:

1. Spacing of men in crews

a. Maximum interval compatible with efficient work in

(1) Mature timber stand with little ground cover
(2) Open stands with heavy ground cover.
(3) Dense reproduction with dead and down timber

Type 5. Thicket: crew works with interval of 75 to 150 feet, according to density of cover, locating clearings where they may occur. These clearings are carefully worked. Any large clearings are marked, and worked by scouts.

Type 6. Fire burn: crew works with interval of [illegible] to [illegible] feet, depending on density of brush, which is dependent on age of burn. Careful search necessary to find Ribes, which are apt to be numerous.

Results of Work

A. Eradication

The field season was opened on June 15, when an advance party of men went to the Upper Priest River Area to prepare camps and move in supplies. On June 16, a party of men, consisting of reconnaissance recorders, crew foremen, scouts, and educational men went to the area for preliminary training. On July 1, men constituting the crewmen went to the area.

Of the entire field force of men permanently on the ground for Ribes eradication only seven had had any previous experience in this work. It was therefore necessary to put the entire force thru a period of training. This training period extended from June 20 (the date upon which the work actually started in the field) to July 12. The period June 20 to July 1 was devoted to training the recorders, foremen, scouts and educational men; the period July 1 to July 12 represents the training of the crew men.

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2. Method of eradication on slopes

a. Parallel with contours.
b. Up hill
c. Down hill.

3. Most efficient way of changing crew formation, where more than one eradication type occurred within a block.

4. Use of tools in eradicating Ribes.

The period July 27 to September 20 has been considered as the actual work period. During this time, the best methods of Ribes eradication which had been evolved were put into operation on a sufficient scale to at least partially prove their value. The cost figures obtained during this period have been generally used as indicating the true cost at which this work can now be done by this office.

The following tabulation will give the cost, acreage and Ribes figures for these three periods of work:

Table VIII

General Results of Ribes Eradication

Period	Ribes Pulled R. lacustre	Ribes Pulled R. viscosissimum	Ribes Pulled Total	Area Worked (Acres)	Ribes per Acres	Cost per Acre	Cost per Ribes	Total Cost
Training	8947	808	9755	511	19.1	$ 8.61	$ .451	$4402.47
Experimental	55071	2292	57363	1863	30.7	3.02	.10	5625.59
Working	176611	83646	260257	5506	47.3	1.63	.034	8972.36
Total	240629	86746	327375	7880	41.5	2.41	.058	$19000.42

As Table 8 shows, both the cost per acre and the cost per Ribes pulled were materially decreased during the course of the season. A greater percentage of decrease, from the training period to the working period, is shown in the cost per Ribes pulled than in the cost per acre. This is due to the fact that most of the training period was spent on land with few Ribes per acre. As the interval between men in the crew formation was necessarily small during the training period, this combination of small interval and few Ribes is reflected in a heavy cost per Ribes pulled. This indicates a valuable lead in organizing such field work during future seasons. Due to a changing personnel, it will probably always be necessary to devote some time at the beginning of each season to the training of inexperienced men. The work during such a period should be done on land where Ribes are numerous and where working conditions would necessitate a narrow interval between even experienced crew men. Conditions usually

2. Method of eradication on slopes

   a. Parallel with contours.
   b. Up hill
   c. Down hill.

3. Most efficient way of changing crew formation, where more than one eradication type occurred within a block.

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The following tabulation will give the cost, acreage and Ribes figures for these three periods of work:

Table VIII

General Results of Ribes Eradication

Period	Ribes Pulled: R. lacustre	Ribes Pulled: R. viscosissimum	Ribes Pulled: Total	Area Worked (Acres)	Ribes per Acre	Cost per Acre	Cost per Ribes	Total Cost
Training	8947	808	9755	511	19.1	$8.61	.451	$4402.47
Experimental	55071	2292	57363	1365	30.7	3.02	.10	5522.39
Working	176611	83646	260257	5506	47.3	1.65	.034	9072.56
Total	240629	86746	327375	7030	41.5	2.41	.058	$19000.43

As Table 8 shows, both the cost per acre and the cost per Ribes pulled were materially decreased during the course of the season. A greater percentage of decrease, from the training period to the working period, is shown in the cost per Ribes pulled than in the cost per acre. This is due to the fact that most of the training period was spent on land with few Ribes per acre. As the interval between men in the crew formation was necessarily small during the training period, this combination of small interval and few Ribes is reflected in a heavy cost per Ribes pulled. This indicates a valuable lead in organizing such field work during future seasons. Due to a changing personnel, it will probably always be necessary to devote some time at the beginning of each season to the training of inexperienced men. The work during such a period should be done on land where Ribes are numerous and where working conditions would necessitate a narrow interval between even experienced crew men. Conditions usually

occurring in eradication Type 1 will prove suitable for training new men, as such land necessitates intensive working in any case.

Table 9, Given below shows a division of the area covered by Ribes eradication and the costs of this work on the basis of the eradication types described above. This work was done during the working period with the exception of the 12 acres of Type 6, a four year burn encountered during the experimental period. This is here included for comparison with the other types.

Table IX

Ribes Eradication by Eradication Types.

Type	R. lacustre Number	R. lacustre Percent of Total Ribes	R. viscosissimum Number	R. viscosissimum Percent of Total Ribes	Total Number of Ribes	Area (Acres)	Ribes per Acre	Cost per Acre	Cost per Ribes Pulled	Total Cost
1. Creek Type	46884	96.4	1742	3.6	48626	255.9	190.0	$6.60	$.035	$1689.18
2. Ribes Free Type	25662	68.0	12091	32.0	37753	2953.4	12.9	.79	.061	2320.77
3. Brush or Reproduction Uniform	95901	60.3	63224	39.7	159125	1732.4	91.9	2.36	.026	4084.65
4. Brush or Reproduction patchy	5223	59.2	3607	40.8	8830	254.0	34.8	1.57	.045	400.88
5. Thicket	2941	49.6	2982	50.4	5923	309.3	19.1	1.54	.081	476.88
6. Four Year Burn	7037	100.0	0	0	7037	12.0	586.4	12.55	.021	150.56
Total	183648		83646		267294	5518.0	48.4	1.65	.034	9122.92

Table 9. shows that in general the cost per acre varies directly with the number of Ribes per acre, and that these two vary inversely with the cost per Ribes pulled. Because of the difficulty of working conditions, coupled with low Ribes per acre, Type 5 has a high cost per Ribes pulled, and a relatively low cost per acre. Type 1 shows a rather high cost per bush pulled in relation to the large number per acre. This is due to the fact that because of working conditions this type must all be covered in close crew formation, while the Ribes are generally in concentrations over relatively small parts of the area. Thus, considerable ground is often covered in close crew formation without pulling any Ribes.

Table 10 given below, gives the cost of subsistence, for the Ribes eradication, reconnaissance, and ecological study crews, during the summer,

occurring in eradication type 1 will prove suitable for training new men, as such land necessitates intensive checking in any case.

Table 9, given below, shows a division of the area covered by Ribes eradication and the costs of this work on the basis of the eradication types described above. This work was done during the working period with the exception of the 12 acres of Type 6, a four year burn encountered during the experimental period. This is here included for comparison with the other types.

Table 9

Ribes Eradication by Eradication Types.

Type	R. lacustre Number	R. lacustre Percent of Total Ribes	R. viscosissimum Number	R. viscosissimum Percent of Total Ribes	Total Number of Ribes	Area (Acres)	Ribes per Acre	Cost per Acre	Cost per Ribes Pulled	Total Cost
								$	$	$
1. Creek Type	46884	96.4	1742	3.6	48626	255.9	190.0	6.59	.035	1685.1
2. Ribes Free Type	25662	68.0	12051	32.0	37713	2955.4	12.8	.79	.061	2320.7
3. Brush or Reproduction Uniform	95901	60.3	63224	39.7	159125	1732.4	91.9	2.36	.026	4084.6
4. Brush or Reproduction patchy	5223	59.2	3607	40.8	8830	254.0	34.8	1.57	.045	400.3
5. Thicket	2941	49.6	2982	50.4	5923	309.3	19.1	1.54	.081	476.3
6. Four Year Burn	7067	100.0	0	0	7067	12.0	588.9	12.53	.021	150.3
Total	183648		83646		267294	5519.0	48.4	1.65	.034	9122.2

Table 9 shows that in general the cost per acre varies directly with the number of Ribes per acre, and that these two vary inversely with the cost per Ribes pulled. Because of the difficulty of working conditions, coupled with low Ribes per acre, Type 5 has a high cost per Ribes pulled, and a relatively low cost per acre. Type 1 shows a rather high cost per bush pulled in relation to the large number per acre. This is due to the fact that because of working conditions this type must all be covered in close crew formation, while the Ribes are generally in concentrations over relatively small parts of the area. Thus, considerable ground is often covered in close crew formation without pulling any Ribes.

Table 10 given below, gives the cost of subsistence, for the Ribes eradication, reconnaissance, and ecological study crews, during the summer,

Table X

Cost of Subsistence

	Wages Cooks and Helpers	Cost of Food	Cost Transportation of Food	Cost Handling at Warehouse	Total Cost
Total for season	$1388.73	4776.08	$1840.62	$ 351.82	$8075.14
Number of days basis	4852	6553	6553	6553	
Cost per Man-day	$ .29	$ .73	$ .28	$ .05	$ 1.35

In this table the number of days basis differs from the others in the case of wages of cooks and helpers, because of the fact that this item is only chargeable against Ribes eradication, the men employed upon the other sub-projects doing their own cooking. On this basis, the cost of subsistence per man-day for those sub-projects on which the men did their own cooking was $1.06 per day, or .35 per meal. This cost permeal to feed the men in the Ribes eradication camps was .45.

B (2.22) Checking

During the course of the eradication work, special checks were made on 34 plots or strips, totalling 98 acres, or 1.24% of the area worked. This checking was entirely separate from that done by the eradication crews themselves who frequently checked back to determine and keep up their own efficiency. These special checks were of several different types, as follows:

1. Plots of different sizes, laid off after the crews had covered the ground, laid out on different working blocks and on different eradication types.

2. Strips, run over ground previously worked by the crews; 1 or 2 rods in width and of varying length; on different working blocks and different eradication types; generally run at right angles to the eradication strips.

3. Advance plots, laid off and the ribes located in advance of the crews, the locations unknown to the crews, and checked afterward; size, 1 square chain.

4. Special crew checking. A crew of picked men, in regular crew formation, working a strip 50 feet wide.

In this checking work, 2 bases of efficiency were taken into account. On actual eradication work, the cost per acre could be greatly increased by a **careful** search for all Ribes seedlings a few inches in height. It is not yet known, if, under western conditions, this increased cost is justified by the increased efficiency. Checking records were kept on a double basis: (1) counting as misses only Ribes plants above the very small seedling stage, and (2) counting these seedlings as missed bushes. The difference in percent of efficiency between these 2 bases is 6.7.

Table 11, given below, shows the results of the checking done. The special crew checks are figured separately, as in this work the small seedlings were not searched for.

B (2.22) Checking

During the course of the eradication work, special checks were made on 34 plots or strips, totalling 95 acres, or 1.24% of the area worked. This checking was entirely separate from that done by the eradication crews themselves who frequently checked back to determine and keep up their own efficiency. These special checks were of several different types, as follows:

1. Plots of different sizes, laid off after the crews had covered the ground, laid out on different working blocks and on different eradication types.

2. Strips, run over ground previously worked by the crews; 1 or 2 rods in width and of varying length; on different working blocks and different eradication types; generally run at right angles to the eradication strips.

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Table 11, given below, shows the results of the checking done. The special crew checks are figured separately, as in this work the small seedlings were not searched for.

TABLE XI

Strip No.	Plot No.	No. Acres Checked	No. Ribes Missed Per Acre: No. Seedlings R. lac.	R. vis.	No. Bushes over 1 Ft. L.S.: R. lac.	R. vis.	Total: R. lac.	R. vis.	Total of all species	No. eradicated per acre	Total No. Ribes per Acre: With missed seedlings	Without missed seedlings	% Efficiency of Eradication: With missed seedlings counted	With missed seedlings not counted
	1	1.0								5.5	5.5	5.5	100.0	100.0
	2	1.0	1.0						1.0	5.0	6.0	5.0	83.33	100.0
	3	1.0	7.0		6.0				13.0	115.0	128.0	121.0	89.80	95.0
	4	0.1								115.0	115.0	115.0	100.0	100.0
	5	1.0								5.5	5.5	5.5	100.0	100.0
	6	1.0	6.0		4.0		10.0		10.0	85.1	95.1	89.1	89.5	95.5
	7	1.0	11.0		3.0		14.0		14.0	85.1	99.1	88.1	85.9	96.6
	8	1.0	2.0				2.0		2.0	85.1	87.1	85.1	97.7	100.0
	9	1.0	7.0		2.0		9.0		9.0	85.1	94.1	87.1	90.4	97.7
	10	1.0	14.0		15.0		29.0		29.0	85.1	114.1	100.1	74.6	85.0
	11	1.0	17.0		16.0		33.0		33.0	85.1	118.1	101.1	72.1	84.2
	12	1.0	1.0		7.0		8.0		8.0	85.1	93.1	92.1	91.4	92.4
	13	1.0	15.0		15.0		30.0		30.0	85.1	115.1	100.1	73.9	85.0
1		2.15	1.67	3.33	2.93	25.4	4.60	28.73	33.3	195.0	228.3	223.3	85.4	87.3
2		3.2	2.76	4.13	6.04	11.27	8.80	15.40	24.2	138.0	162.2	153.45	85.1	90.0
3		1.0							45.0	412.5	457.5		90.2	
4		1.3								85.1	85.1	85.1	100.0	100.0
5		2.0	0.5		0.5		1.0		1.0	85.1	86.1	85.6	98.8	99.4
6		0.6			6.7		6.7		6.7	85.1	91.8	91.8	92.7	92.7
7		20.0	2.6		5.0		7.6		7.6	85.1	92.7	90.1	91.8	94.5
8		7.5	1.2		2.5		3.7		3.7	6.7	10.4	9.29[illegible]	64.4	72.8
9		.875	4.3		16.3		20.6		20.6	61.0	81.6	77.3	74.8	78.9
10		7.5	0.8		3.6		4.4		4.4	19.0	23.4	22.6	81.2	84.1
11		1.9	1.6		2.6		4.2		4.2	19.0	23.2	21.6	81.9	90.1
12		2.0	1.0		4.5		5.5		5.5	28.0	40.0	44.5	70.0	90.0
13		2.0	2.0		5.0		7.0		7.0	19.0	26.0	24.0	73.1	79.2
14		0.5	6.0		28.0		34.0		34.0	7.4	41.4	35.4	17.9	20.9
15		.75	10.7		20.1		30.8		30.8	36.0	66.8	56.1	53.9	64.2
16		.75	16.0		20.0		36.0		36.0	64.7	100.7	84.7	64.0	76.4
17		1.0								11.0	11.0	11.0	100.0	100.0
18		1.25	8.8		10.4		19.2		19.2	49.0	68.2	59.4	71.8	82.5
19		2.0	4.5		8.0		12.5		12.5	85.0	97.2	93.0	87.2	91.4
20		2.0	3.5		14.0		17.5		17.5	50.0	67.5	64.0	74.1	78.1
21		.625	13.8		2.7		16.5		16.5	40.0	56.5	42.7	70.8	93.7
22		.666	4.5		3.0		7.5		7.5	16.5	24.0	19.5	68.7	84.6
23		.667	10.5		11.8		22.3		22.3	33.0	55.3	44.8	55.0	73.7
24		.7	30.3				30.3		30.3	586.4	616.7	586.4	95.1	100.0
25		1.0	9.0		8.0		17.0		17.0	163.0	180.0	171.0	90.6	95.3
26		.6	15.0		43.0		58.0		58.0	59.4	117.4	102.4	50.6	58.0
27		1.6	2.5		14.5		17.0		17.0	109.0	126.0	123.5	86.5	88.3
28		1.8	[illegible]		12.2		12.2		12.2	112.0	124.2	124.2	90.2	90.2
Total		80.033			Average			Efficiency		Per		Acre	83.2	88.9
							Special		Crew	Checking				
29		5.0					0.6		0.6	59.0	59.6		99.0	
30		10.0					3.3		3.3	59.0	62.3		94.7	
31		0.8								100.0	100.0		100.0	
32		1.0					6.0			95.0	101.0		96.0	
33		0.5					18.0			216.0	232.0		92.3	
34		0.67											100.0	
Total acres checked		17.97			Average			Efficiency		Per		Acre	96.3	

This table shows an average efficiency of 83.2% when missed seedlings were counted as misses, and 88.9% when they were not. On the special crews checks, the average efficiency was 96.3%.

Plots 1 and 2 in table 11 represent the advance plot checks. Table 12 gives the results of these 2 plots by feet of live stem, as well as by number of bushes by live stem classes.

These plots, while too limited in number to give conclusive evidence, tend to corroborate the evidence in table 11 that most of the Ribes missed are very small bushes. On Plot 1, the efficiency by number of bushes is 87.1%; by feet of live stem it is 94.3% Further no bushes were missed having more than 6 feet of live stem.

Table 13, represents the results of a special checking study in relation to the efficiency of men who had been on forest fire. Four 2-acre plots were checked, on each plot containing 2 subplots of 1 acre each, the subplots in each case representing the work of the same crew before and after a week of fire-fighting. The plots were chosen adjoining each other on as nearly comparable ground as the checker could select.

This table brings out two points: first, that the same men missed many more Ribes after a number of days of fire-fighting than they did before, and secondly that the highest percentage of misses were in the classes having one foot or more of live stem. In other words after a fire they missed a higher percentage of the larger bushes.

From the summary of the check plots it is evident that as a result of fire fighting three times as many Ribes were missed compared with the number the same men would have missed if they had not had any fire fighting.

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From the summary of the check plots it is evident that as a result of fire fighting three times as many Ribes were missed compared with the number the same men would have missed if they had not had any fire fighting.

TABLE XII

Advance Plot Checks

			No. Bushes by Live Stem Classes													
			1	2	3	4	5	6	7	8	9	10	11-15	16-25	26-50	Total
Acre Plot 1	No. of Bushes	Before Eradication	28	18	15	8	7	7	4	3	1	6	12	6	2	117
		After Eradication	4	6	1	1	2	1	—	—	—	—	—	—	—	15
% of Efficiency			85.7	66.7	93.3	87.5	77.8	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.1
Acre Plot 2	No. of Bushes	Before Eradication	6	6	2	2	—	1	—	—	—	1	—	1	—	19
		After Eradication	—	—	—	—	—	—	—	—	—	—	—	—	—	—
% of Efficiency			100.0	100.0	100.0	100.0	100.0	100.0				100.0		100.0		100.0
Acre Plot 1	No. feet of Live Stem	Before Eradication	28	36	45	32	35	42	28	24	9	60	150	120	75	684
		After Eradication	4	12	3	4	10	6	—	—	—	—	—	—	—	39
% of Efficiency			85.7	66.7	93.3	87.5	77.8	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.3
Acre Plot 2	No. feet of Live Stem	Before Eradication	6	12	6	8	—	6	—	—	—	10	—	20	—	68
		After Eradication	—	—	—	—	—	—	—	—	—	—	—	—	—	—
% of Efficiency			100.0	100.0	100.0	100.0		100.0				100.0		100.0		100.0

Average Efficiency by Number of Bushes 93.4%

Average Efficiency by Feet of Live Stem 97.3%

Note: Plots checked before and after being worked by eradication crew. Crew did not know this work was being done.

TABLE XII

Advance Plot Checks

			No. Bushes by Live Stem Classes													
			1	2	3	4	5	6	7	8	9	10	11-15	16-25	26-50	Total
Acre Plot 1	No. of Bushes	Before Eradication	28	13	15	8	7	7	4	3	1	6	12	6	2	117
		After Eradication	4	6	1	1	2	1	—	—	—	—	—	—	—	15
% of Efficiency			85.7	66.7	93.3	87.5	77.8	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.1
Acre Plot 2	No. of Bushes	Before Eradication	6	6	2	2	—	1	—	—	—	1	—	1	—	19
		After Eradication	—	—	—	—	—	—	—	—	—	—	—	—	—	—
% of Efficiency			100.0	100.0	100.0	100.0	100.0	100.0				100.0		100.0		100.0
Acre Plot 1	No. feet of Live Stem	Before Eradication	28	36	45	32	35	42	22	24	9	60	150	120	75	684
		After Eradication	4	12	3	4	10	6	—	—	—	—	—	—	—	39
% of Efficiency			85.7	66.7	93.3	87.5	77.8	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	[illegible]
Acre Plot 2	No. feet of Live Stem	Before Eradication	6	12	6	8	—	6	—	—	—	10	—	20	—	68
		After Eradication	—	—	—	—	—	—	—	—	—	—	—	—	—	—
% of Efficiency			100.0	100.0	100.0	100.0		100.0				100.0		100.0		100.0

Average Efficiency by Number of Bushes 93.4%

Average Efficiency by Feet of Live Stem 97.3%

Note: Plots checked before and after being worked by eradication crew. Crew did not know this work was being done.

TABLE XIII
Before and After Fire Checks

		No. Ribes Missed by Live Stem Classes																
		2"	4"	6"	8"	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11-25	26-50	Total
Acre Plot No. 1	No. missed Ribes: Acre Worked after fire	2	1	3	1	7	4	3	1	2	2	—	—	—	2	1	—	29
	No. missed Ribes: Acre Worked before fire	—	2	2	1	1	3	—	—	—	1	—	—	—	—	—	—	10
Acre Plot No. 2	No. missed Ribes: Acre Worked after fire	—	1	4	4	8	7	4	2	1	2	—	—	—	—	—	—	33
	No. missed Ribes: Acre Worked before fire	—	2	2	4	3	3	—	—	—	—	—	—	—	—	—	—	14
Acre Plot No. 3	No. missed Ribes: Acre Worked after fire	—	—	—	—	1	5	1	—	—	—	—	1	—	—	—	—	8
	No. missed Ribes: Acre Worked before fire	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2
Acre Plot No. 4	No. missed Ribes: Acre Worked after fire	2	1	2	4	6	7	2	3	—	1	—	1	—	—	1	—	30
	No. missed Ribes: Acre Worked before fire	1	1	1	2	2	—	2	—	—	—	—	—	—	—	—	—	9
Total: Plots	No. missed Ribes: 4 acres Worked after fire	4	3	9	9	22	23	10	6	3	5	—	2	—	2	2	—	100
	No. missed Ribes: 4 acres Worked before fire	2	5	5	7	7	6	2	—	—	1	—	—	—	—	—	—	35

TABLE XIII
Before and After Fire Checks

Acre Plot No.	No. Ribes Missed		2"	4"	6"	8"	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11-25	26-50	Total
1	Acre Worked:	after fire	2	1	3	1	7	4	3	1	2	2	—	—	—	2	1	—	29
	Acre Worked:	before fire	—	2	2	1	1	3	—	—	—	—	—	—	—	—	—	—	10
2	Acre Worked:	after fire	—	1	4	4	8	7	4	2	1	2	—	—	—	—	—	—	33
	Acre Worked:	before fire	—	2	2	4	3	3	—	—	—	—	—	—	—	—	—	—	14
3	Acre Worked:	after fire	—	—	—	—	1	3	1	—	—	—	—	1	—	—	—	—	5
	Acre Worked:	before fire	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2
4	Acre Worked:	after fire	2	1	2	4	6	7	2	3	—	1	—	1	—	—	1	—	30
	Acre Worked:	before fire	1	1	1	2	2	—	2	—	—	—	—	—	—	—	—	—	9
Total Plots:	4 acres Worked:	after fire	4	3	9	9	22	23	10	6	3	5	—	2	—	2	2	—	100
	4 acres worked:	before fire	2	5	5	7	7	6	2	—	—	1	—	—	—	—	—	—	35

To determine if any special site conditions were particularly responsible for bushes being missed, a special study was made on the 362 bushes found by the checkers on 72 acres of ground. The following table gives the number and percentage of bushes missed on each of several typical site conditions.

TABLE XIV
Site Condition of Missed Bushes

Site	No. of Missed Ribes	% of Total Missed Ribes
Raised ground adjoining mature trees	69	19.1
Rock outcrop association	71	19.6
Damp Slope and Alder bottoms	61	16.9
Upturns	56	15.5
Windfalls (on, under, or behind)	29	8.0
Dry draws	25	7.0
On decayed stumps and logs	21	5.7
Mulch of decayed branches	15	4.1
In dense brush	7	1.9
On creek banks	3	0.8
Covered by pulled Ribes	2	0.6
Miscellaneous	3	0.8
Total	362	100.0

C (312) Results of Control Reconnaissance on Federal Lands, 1924

The area covered by Federal reconnaissance crews lies entirely within the boundaries of the Kaniksu National Forest in northern Idaho. It includes the drainage of the Upper Priest River and its tributaries from the point where reconnaissance work stopped in 1923 south to the north boundary of the Priest Lake Timber Protective Association. It also includes the drainage of Hughes Fork of Gold Creek south to and including the drainage of Quartz Creek. The map accompanying the office report shows the limits of this area.

While the area lies in one block, it was studied as three units as follows:

1. Upper Priest River, eradicated-- 7, 113 acres
2. Upper Priest River, not eradicated 4, 128 acres
3. Hughes Fork and its tributaries, not eradicated 10, 865 acres

Total acres 22, 106

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Total acres 22,106

Control Reconnaissance on this area was performed as explained above, by four crews of two men each, working under a Field Supervisor, who gave half his time to this project, and devoted the remainder of his time to similar work carried on on lands in the Priest Lake Timber Protective Association.

There follows a detailed description of the work done on each Unit Area:

I. Upper Priest River, Eradicated.

This area does not include the entire portion eradicated in 1924, but only that portion covered by reconnaissance in 1924, beginning where reconnaissance left off in 1923, approximately between Sections 14 and 23, T. 63 N., R. 5 W. The map shows the limits of this block. The area occupies all or part of the following Sections:

In T. 65 N--R. 5 W--Boise Meridian, Idaho
Sect.--22, 23, 26, 27, 28, 33, 34, 35.

In T. 64 N--R. 5 W--Boise Meridian, Idaho
Sect.--3, 4, 9, 10, 15, 16.

Table No. 15 shows the number of acres of each timber age class in each eradication type.

TABLE XV

Number of Acres of each Timber Age Class in each Eradication Type in Upper Priest River Area, Eradicated.

Timber Age Class Years	Eradication Type------Acres 1	2	3	4	5	Total Acres	% of area in each Timber Age Class
20-40	152	---	839	*418	412	1821	25.6
40-60	20	---	714	*282	37	1053	14.8
100-200	113	1320	769	59	---	2261	31.8
200 +	318	1573	---	* 87	---	1978	27.8
Total	603	2893	2322	846	449	7113	
% of area in each eradication type.	8.5	40.7	32.6	11.9	6.3		100.

*When this Upper Priest River area was reconnaissanced, the idea of eradication types had not been evolved, consequently the eradication crews determined the eradication types. When the eradication types were worked out from the reconnaissance notes there were certain discrepencies

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I. Upper Priest River, Eradicated.

This area does not include the entire portion eradicated in 1924, but only that portion covered by reconnaissance in 1924, beginning where reconnaissance left off in 1923, approximately between Sections 14 and 23, T. 65 N., R. 5 W. The map shows the limits of this block. The area occupies all or part of the following Sections:

In T. 65 N--R. 5 W--Boise Meridian, Idaho
Sect.--22, 23, 26, 27, 28, 33, 34, 35.

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*When this Upper Priest River area was reconnaissanced, the idea of eradication types had not been evolved, consequently the eradication crews determined the eradication types. When the eradication types were worked out from the reconnaissance notes there were certain discrepencies

as follows:as follows:

100 acres, 20-40 year age class, eradicated as Eradication Type 2, considered as Eradication Type 4 in this table.

141 acres, 40-60 year age class, eradicated as Eradication Type 2, considered as Eradication Type 4, in this table.

6 acres, 200 + year age class, eradicated as Eradication Type 5, considered as Eradication Type 4 in this table

Table No. 16 shows the eradication factors per acre for the different eradication types in each timber age class.

TABLE XVI

White Pine and Ribes Conditions, by Timber Age Classes and Eradication Types. Upper Priest River Area Eradicated

Timber Stand: Age Class Years	Timber Stand: Composition	Eradication Type	Acres	Chains of reconnaissance strip	Timber per Acre: Mature: White Pine: Ave. DBH in inches	Mature: White Pine: No.	Mature: Mixed No.	Poles: White Pine No.	Poles: Mixed No.	Reproduction: White Pine No.	Reproduction: Mixed No.	Ribes per Acre: R. lac.	R. viscoss.	Total	Brush: Genera	Height Feet	Density %	Windfall	Visibility
20-	C-DF-H-S-WP-WF	1	152	46	---	2	38	19	50	70	1072	199	4	203	Sal-Aln-Rub-Acer	6	61	M	6
	WP-WF-H-C-S-DF	3	839	279	----	5	25	65	80	321	2314	21	85	106	Aln-Sal-Rub	5	45	M	6
40.	WP-C-DF-WF-H	4	418	190	---	40	22	140	173	204	1280	20	22	42	Aln-Pac-Sal-Rub	4	33	M	7
	WP-H-C-WF-DF	5	412	410	---	11	23	55	96	425	5957	4	22	26	Pac-Aln-Rub	3	15	M	7
Ave.	WP-C-WF-H-DF	All	1821	925	8-12"	13	24	74	105	331	3640	22	40	62	Aln-Sal-Pac-Rub	4	32	M	7
40-	No data	1	20	5		No		Data				16	---	16	Pac-Cean-Rub	4	10	M	9
	WP-C-DF-H-WF	3	714	112	---	44	25	113	293	58	1881	Few	10	10	Aln-Rub-Pac-Sal	3	25	---	7
60.	WP-C-DF-WF	4	282	110	---	74	28	137	261	205	2737	1	Few	1	Sal-Aln-Rhod	3	11	---	10
	WP-H-C	5	37	37	---	64	25	244	190	120	5902	--	--	--	-----	---	---	M	6
AVE	WP-C-DF-H-WF	All	1053	264	10-12	59	26	142	265	129	2788	1	4	5	Aln-Sal-Rub	3	14	L	8
100-	No data	1	113	13	----------	No		Data	--**--		----	68	3	71	Aln-Sal-Acer-Pac	8	58	--	8
	WP-C-H-WF-DF	2	1320	503	--------	45	137	7	76	9	290	4	Few	4	Pac-Vac-Tax	2	13	L	25
200.	WP-WF-S-C-H	3	769	117	*---------	47	125	9	231	6	529	24	--	24	Acer-Vac-Aln-Menz	4	22	H	12
	C-WF-H-WP	4	59	13	-------	6	55	18	123	49	2419	142	--	142	Pac-Acer-Tax	3	40	M	5
AVE	WP-C-WF-H-S-DF	All	2261	646	16"-22"	44	131	8	122	10	427	12	--	12	Pac-Vac-Aln-Tax	2	17	L	22
	C-H-WP	1	318	43	----	13	107	17	48	4	384	73	--	73	Tax-Ech-Sal-Aln	4	36	L	12
200+	C-H-WP	2	1573	263	----	7	113	2	87	5	575	Few	--	--	Tax-Pac-Vac-Ech	2	23	M	12
	C-H	4	87	9	----	--	107	--	249	---	600	120	--	120	Tax-Vac-Ferns	3	65	M	6
AVE	C-H-WP	All	1978	315	20"-26"	8	112	4	86	4	550	13	--	13	Tax-Pac-Vac-Ech	3	26	M	12

Explanation of abbreviations used in all tables.

Timber

C--cedar; D.F.--Douglas fir; H.--hemlock; S.--spruce; W.P.--white pine;
W.F.--white fir; L.--larch; L.P.--lodgepole pine.

Brush

Acer--Acer circinatum--vine maple
Aln --Alnus species--alder
Cean--Ceanothus species--buck brush
Ech --Echinopanax horridum--Devils Club
Ep --Epilobium angustifolium--Fireweed
Lon --Lonicera spp.--wild honeysuckle
Menz--Menziesia ferruginea
Pac --Pachistima myrsinites
Rhod--Rhododendron albiflorium
Rub --Rubus species--thimbleberry, raspberry
Sal --Salix species--willow
Tax --Taxus brevifolia--western yew
Vac --Vaccinium spp.--huckleberry

Windfall

H--Heavy windfall
M--Medium windfall
L--Light windfall
-- Windfall practically absent

Ribes

R. viscoss.--Ribes viscossissimum
R. lac. --Ribes lacustre
R. acer. --Ribes acerifolium

The following observations may be pointed out from Table 16:

1. In general, eradication type limits, and timber age class limits do not coincide. Eradication Types 1 and 4 accur in all four Timber Age Classes. Eradication Type 2 is confined to mature and over mature stands.

2. The largest volume of mature white pine is found in the 100 to 200 year age class where it makes up over 25% of the mature trees in the stand. White pine poles and reproduction are nearly negligible.

3. The overmature stand, which is confined exclusively to the level valley floor of the Upper Priest River, contains only approximately 7% by count of mature white pine. The stand is composed chiefly of over mature, badly rotted cedar and hemlock. There is considerable windfall

Explanation of abbreviations used in all tables.

Timber

C--cedar; D.F.--Douglas fir; H.--hemlock; S.--spruce; W.P.--white pine;
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Acer--Acer circinatum--vine maple
Aln --Alnus species--alder
Cean--Ceanothus species--buck brush
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Lon --Lonicera spp.--wild honeysuckle
Menz--Menziesia ferruginea
Pac --Pachistima myrsinites
Rhod--Rhododendron albiflorum
Rub --Rubus species--thimbleberry, raspberry
Sal --Salix species--willow
Tax --Taxus brevifolia--western yew
Vac --Vaccinium spp.--huckleberry

Windfall

H--Heavy windfall
M--Medium windfall
L--Light windfall
-- Windfall practically absent

Ribes

R. viscos.--Ribes viscosissimum
R. lac. --Ribes lacustre
R. acer. --Ribes acerifolium

The following observations may be pointed out from Table 15:

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2. The largest volume of mature white pine is found in the 100 to 200 year age class where it makes up over 25% of the mature trees in the stand. White pine poles and reproduction are nearly negligible.

3. The overmature stand, which is confined exclusively to the level valley floor of the Upper Priest River, contains only approximately 7% by count of mature white pine. The stand is composed chiefly of over mature, badly rotted cedar and hemlock. There is considerable windfall

due to the presence of such over mature trees. There is an understory of cedar and hemlock poles, and scattering cedar, hemlock reproduction. White pine trees, below mature size, are practically absent.

4. In the 40-60 year age class, there is the largest number of mature white pine per acre. Over 69% of the trees over 8" D.B.H. are white pine. The average white pine is 10-12" D.B.H. In this age class there are 142 white pine poles, over 1/3 of the poles being white pine.

5. The 20-40 age class is essentially a pole-reproduction stand, with only 13 white pine per acre averaging 8" to 10" D.B.H. 35% of the trees over 8" D. B. H. are white pine, and 42% of the poles are white pine.

6. The largest number of Ribes per acre is found in Eradication Type 1 in the 20-40 year age class. 98% of the Ribes here are Ribes lacustre.

7. Ribes viscossissimum is most numerous in the 20 to 40 year age class. It is practically negligible after the 40-60 year age class, probably being shaded out. Ribes lacustre is present in all age classes.

8. In general, it may be noted that the number of Ribes per acre varies directly as the density of the bush. This is particularly true in the 20-40 year age class.

9. It is also evident that Salix spp., Alnus spp., and Rubus spp., are the chief associates and indicators of Ribes, due probably to the fact that they indicate soil moisture.

Table 17 shows the Ribes conditions by eradication types irrespective of Timber Age Classes.

TABLE XVII

Summary of Ribes Conditions by Eradication Types,
Upper Priest River Area, Eradicated

Eradication Type	Acres	Chains Studied	Ribes per Acre: R. lac.	R. viscoss.	Total	Brush: Genera	Ht.	Den.	Windfall	Visibility
1	603	107	124	2	126	Sal-Tax-Aln-Ech-Rub	5	47	L	9
2	2893	766	3	Few	3	Pac-Tax-Vac-Ech	2	17	L	21
3	2322	508	16	49	65	Aln-Acer-Sal-Vac-Rub	4	36	M	8
4	846	322	21	13	34	Aln-Sal-Pac-Tax-Rub	4	23	M	8
5	449	447	4	20	24	Pac-Aln-Rub	3½	13	M	7
All	7113	2150	15	18	33					

An examination of the above table shows the following facts:

1. Eradication Type 1 has the largest number of Ribes per acre; followed in order by Type 3, Type 4, Type 5, Type2.

2. The density of bush in the different Eradication Types follows the same order, with the exception of Type 2 in which the bush density is greater than in Type 5. This is probably due to the fact that the brush found on Eradication Type 2 areas is greater in tolerance than are the Ribes, hence the relatively few Ribes found.

3. Altho the brush is relatively absent in Type 5, the great amount of coniferous thicket reduces the visibility.

II. Upper Priest River, Not Eradicated

This area includes that portion of the Upper Priest River drainage lying south of the portion eradicated to the northern limits of the Priest Lake Timber Protective Association lands. The larger map shows the limits of this area.

This area occupies all or part of the following sections:

In T. 64 N--R. 5W, Boise Meridian, Idaho
Sections 1-2-3-10-11-12-13-14-15.

In T. 64 N--R. 4W, Boise Meridian, Idaho
Sections 7 and 8.

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Summary of Ribes Conditions by Eradication Types,
Upper Priest River Area, Eradicated

Eradication Type	Acres	Chains Studied	Ribes per Acre: R. lac.	R. viscoss.	Total	Brush: Genera	Ht.	Den.	Climbability	Visibility
1	603	107	124	2	126	Sal-Tax-Aln-Ech-Rub	5	47	L	9
2	2893	756	3	Few	3	Pac-Tax-Vac-Ech	2	17	L	21
3	2372	508	16	49	65	Aln-Acer-Sal-Vac-Rub	4	56	M	8
4	846	322	21	13	34	Aln-Sal-Pac-Tax-Rub	4	23	M	8
5	449	147	4	20	24	Pac-Aln-Rub	3½	13	M	7
All	7113	2150	15	18	33					

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Sections 1-2-3-10-11-12-13-14-15.

In T. 64 N—R. 4W, Boise Meridian, Idaho
Sections 7 and 8.

Accessibility

A good horse trail runs thru this area from Upper Priest Lake along Upper Priest River. Camp sites established in 1924 large enough to accommodate four eradication crews are located where the trail crosses Rock Creek in Section 10, and at Lime Creek, Section 15.

There are several good camp sites along Lime Creek in Section 11 in the mature stand. No trail goes up Lime Creek, and the creek flows thru a narrow, steep-sided canyon in Sections 14 and 15, until it reaches Upper Priest River valley. Windfalls are numerous. The best possibility of reaching the upper portions of Lime Creek, would be by means of a trail constructed up the ridge on the north side of Lime Creek. It would be necessary to cut a trail thru one mile of 20-40 year timber with numerous windfalls, zigzagging on the slope, then reaching Lime Creek again in the mature timber. Probably the best method of working the head waters of the stream would be by means of fly camps, supplied by back packing.

There is a horse trail up Cedar Creek to Continental Mine. This trail would require some reconstruction work. Soft places are numerous. The grade is fairly good, altho steep in places. McLean Mine, Section 13, about two miles from Priest River Trail, is an excellent campsite. There is an abandoned cabin there with good cook-stove, fire-place, and spring. The site is on a level, cleared bench, affording good opportunities for pitching tents.

Approximately $1\frac{1}{2}$ miles northeast of McLean Mine is another good camp site along the trail on the North Fork of Cedar Creek in mature timber, near the northwest corner of Section 18.

Table 18 shows the number of acres of each timber age class in each eradication type.

TABLE XVIII

Timber Age Class Years	Eradication Type---Acres 1	2	3	4	Total	% of Area in each Timber Age Class
10-20	4	--	133	--	137	3.3
20-40	99	--	536	1128	1763	42.7
40-60	12	--	--	26	38	.9
100-200	283	1871	--	--	2154	52.2
200 +	8	28	--	--	36	.9
Total	406	1899	669	1154	4128	
% of acres in each Erad. type	9.8	46.0	16.2	28.0		100.0

Accessibility

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40-60	12	—	—	26	38	.9
100-200	293	1871	—	—	2164	52.2
200 +	8	28	—	—	36	1.0
Total	406	1899	659	1154	4125	
% of acres in each Erad. type	9.8	46.0	16.2	28.0		100.0

It may be noted that over half of the acreage is occupied by mature timber and that nearly half of the acreage is Ribes free. Table 19 shows the eradication factors per acre for the different eradication types in each timber age class.

TABLE XIX

White Pine and Eradication Factors by Timber Age Classes, and Eradication Types for Upper Priest River Area Not Eradicated

Age Class: Years	Timber Stand: Composition	Eradication Type	Acres	Chains studied	Timber per Acre: Mature: White Pine: Ave. DBH in inches	Mature: White Pine: No.	Mature: Mixed No.	Poles: White Pine No.	Poles: Mixed No.	Reprod.: White Pine No.	Reprod.: Mixed No.	Ribes per Acre: R. lac.	Ribes per Acre: R. viscoss.	Ribes per Acre: Total	Brush: Genera	Brush: Height Ft.	Brush: Density	Windfall	Visibility
10-	*	1	4	No	data	--	--	--	--	--	--	--	--	--	----	--	--	--	--
20.	WP-DF-C-S-H	3	133	86	16"	1/3	25	---	49	458	2339	38	17	55	Vac-Sal-Lon	2	20	M	8
Total	WP-DF-C-S-H	All	137	86	16"	1/3	25	--	49	458	2339	38	17	55	Vac-Sal-Lon	2	20	M	8
20-	WP-C-WF-H	1	99	36	----	3	7	42	57	240	598	125	4	129	Aln-Rub-Sal-Pac	4	40	L	8
	WP-C-H-DF-WF	3	536	279	---	1½	15	33	54	516	3033	18	35	53	Aln-Rub-Sal-Pac	3	17	M	6
40.	WP-C-DF-H-L	4	1128	393	---	4	7	58	62	97	756	1	25	26	Rub-Sal-Vac-Aln	4	30	L	8
Total	WP-C-DF-H-WF	All	1763	708	10"-12"	3	11	46	58	301	1827	14	28	42	Aln-Rub-Vac-Sal	4	26	L	8
40-	*	1	12	No	data	--	--	--	--	--	--	--	--	--	-------	--	--	--	--
60.	WP-C-LP-WF-H	4	26	46	10"-15"	37	43	100	171	33	951	3	1	4	S al-Pac-Rub	3	18	--	13
Total	WP-C-LP-WF-H	All	38	46	10"-15"	37	43	100	171	33	951	3	1	4	Sal-Pac-Rub	3	18	--	13
100-	C-H-WP-DF	1	283	183	-----	16	104	14	84	25	588	70	--	70	Rub-Vac-Pac-Ech	2½	26	--	10
200.	WP-C-H-DF-WF	2	1871	592	-----	21	117	8	91	45	750	3	--	3	Pac-Vac-Rub Ech	2	17	--	12
Total	WP-C-H-DF-WF	All	2154	775	18"-22"	20	114	10	89	40	712	18	--	18	Pac-Rub-Vac,Pac-Ech-Tax	2	19	--	12
	C-H	1	8	4	-----	--	100	--	60	--	760	180	--	180	Salix	4	35	--	9
200+	C-H	2	28	14	-----	--	154	--	49	--	1820	--	--	--	Ech-Tax-Ferns	2	13	--	12
Total	C-H	All	36	18	-----	--	142	--	51	--	1584	40	--	40	Ech-Sal-Tax-Ferns	2½	18	--	11

* On the areas covered by 10-20 year age class, and 40-60 year age class there is a small stream flowing through each. The reconnaissance strips did not hit either of these streams in the above mentioned age classes. Since there are undoubtedly Ribes along the streams, those portions were included in Type 1, altho no data regarding the conditions are available.

An examination of Tables 18 and 19 shows the following facts:

1. The largest amount of mature white pine per acre occurs in the 100-200 year, or mature age class. By count, white pine makes up 15% of the mature trees. The average white pine tree in the mature stand is approximately 20" D. B. H. and contains $5\frac{1}{2}$ sixteen foot logs.

2. In the 18 chains describing the 36 acres of 200 + year or overmature age class, no white pines were found. This overmature age class is confined to a narrow strip of level valley floor along the Upper Priest River. The land is occupied by overmature and rotting cedar and hemlock with seedlings underneath.

3. In the 40-60 year age class there are 37 white pine trees per acre 8" D. B. H. or over, or 46% of the mature stand. The average size of the white pine classed as mature is 10" D. B. H., with one log. In this situation, the 40-60 year age class is principally a pole stand. There are 100 white pine poles per acre, or 37% of the poles are white pine.

4. In the 20-40 and 10-20 year age classes, the seemingly large size mature white pines, are those of older age classes which survived the fires. The mature mixed in these age classes are principally Douglas fir trees which were not destroyed by fires.

5. The 20-40 year age class is essentially a pole stand. White pine makes up 44% of the poles.

6. The 10-20 year age class is essentially a reproduction stand in this area, containing 16% white pine.

7. In general, in each timber age class, the number of Ribes per acre varies directly with the density of bush. Eradication type 3, in 20-40 year age class is an exception to this rule.

8. The greatest number of Ribes viscossissimum per acre occurs in the 20-40 year age class. It is practically negligible in the older age classes, probably becoming shaded out.

9. The largest number of Ribes lacustre per acre is found along streams in each timber age class.

Table No. 20 shows the Ribes conditions by Eradication types irrespective of Timber Age Classes.

An examination of Tables 18 and 19 shows the following facts:

1. The largest amount of mature white pine per acre occurs in the 100-200 year, or mature age class. By count, white pine makes up 15% of the mature trees. The average white pine tree in the mature stand is approximately 20" D. B. H. and contains 5½ sixteen foot logs.

2. In the 18 chains describing the 36 acres of 200 + year or overmature age class, no white pines were found. This overmature age class is confined to a narrow strip of level valley floor along the Upper Priest River. The land is occupied by overmature and rotting cedar and hemlock with seedlings underneath.

3. In the 40-60 year age class there are 37 white pine trees per acre 8" D. B. H. or over, or 46% of the mature stand. The average size of the white pine classed as mature is 10" D. B. H., with one log. In this situation, the 40-60 year age class is principally a pole stand. There are 100 white pine poles per acre, or 37% of the poles are white pine.

4. In the 20-40 and 10-20 year age classes, the seemingly large size mature white pines, are those of older age classes which survived the fires. The mature mixed in these age classes are principally Douglas fir trees which were not destroyed by fires.

5. The 20-40 year age class is essentially a pole stand. White pine makes up 44% of the poles.

6. The 10-20 year age class is essentially a reproduction stand in this area, containing 16% white pine.

7. In general, in each timber age class, the number of Ribes per acre varies directly with the density of brush. Eradication type 3, in 20-40 year age class is an exception to this rule.

8. The greatest number of Ribes viscosissimum per acre occurs in the 20-40 year age class. It is practically negligible in the older age classes, probably becoming shaded out.

9. The largest number of Ribes lacustre per acre is found along streams in each timber age class.

Table No. 20 shows the Ribes conditions by Eradication types irrespective of Timber Age Classes.

TABLE XX

Summary of Ribes conditions by Eradication Types, Upper Priest River Area, Not Eradicated

Eradication Type	Acres	Chains Studied	Ribes per Acre: Lac.	Viscoss.	Total	Brush: Genera	Height Ft.	Density %	Visibility (feet)	Windfall
1	406	223	81	1	82	Rub-Aln-Sal-Ech	3	28	---	9
2	1899	606	3	--	3	Pac-Vac-Rub-Ech-Tax	2	17	L	12
3	669	365	23	31	54	Aln-Rub-Vac-Sal-Lon	3	18	M	8
4	1154	439	2	22	24	Rub-Sal-Vac-Aln-Pac	4	29	L	9
Total	4128	1633	18	13	21					

Certain facts are evident from an examination of Tables 19 and 20.

1. Eradication Type 1 (Stream Type) is present in all timber age classes.

2. Eradication Type 2 (Ribes free type) is confined to mature and overmature stands.

3. Eradication Type 3 (Brush and reproduction uniform) and Eradication Type 4 (Brush and reproduction patchy) are chiefly confined to the 20-40 year age class.

4. Eradication Type 1 shows the greatest number of Ribes per acre, followed in order by Types 3, 4, and 2.

5. R. viscossissimum predominates in Eradication Types 3, and 4; while the largest number of R. lacustre occurs in the stream type.

III Hughes Fork Area

Included in this unit are the drainages, Hughes Fork proper, Big Creek, and Quartz Creek. The map shows the location and limits of this area.

This area occupies all or part of the following sections:

In T. 64 N--R 5 W--Boise Meridian, Idaho
Sections 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33

TABLE XX

Summary of Ribes conditions by Eradication Types, Upper Priest River Area. Not Eradicated

Eradication Type	Acres	Chains Studied	Ribes per Acre: Lac.	Viscoss.	Total	Brush: Genera	Height ft.	Density %	Density	[illegible]
1	406	22½	81	1	82	Rub-Aln-Sal-Men	3	28	—	9
2	1599	605	3	—	3	Pac-Vac-Rul-Men-Tax	2	17	L	12
3	669	365	23	31	54	Aln-Rub-Vac-Sal-Lon	3	18	M	8
4	1154	430	2	22	24	Rub-Sal-Vac-Aln-Pac	4	29	L	9
Total	4128	1613½	18	13	21					

Certain facts are evident from an examination of Tables 19 and 20.

1. Eradication Type 1 (Stream Type) is present in all timber age classes.

2. Eradication Type 2 (Ribes free type) is confinded to mature and overmature stands.

3. Eradication Type 3 (Brush and reproduction uniform) and Eradication Type 4 (Brush and reproduction patchy) are chiefly confined to the 20-40 year age class.

4. Eradication Type 1 shows the greatest number of Ribes per acre, followed in order by Types 3, 4, and 2.

5. R. viscosissimum predominates, Eradication Types 3, and 4; while the largest number of R. lacustre occurs in the stream type.

III Hughes Fork Area

Included in this unit are the drainages, Hughes Fork proper, Big Creek, and Quartz Creek. The map shows the location and limits of this area.

This area occupies all or part of the following sections:

In T. 64 N—R 5 W—Boise Meridian, Idaho
Sections 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33

In T--63 N--R 5 W--Boise Meridian, Idaho
Sections 5 and 6

In T--40 N--R 46 E--Willamette Meridian, Washington
Sections 30 and 31

In T--40 N--R 45 E--Willamette Meridian, Washington
Section 36

In T--39 N--R 46 E--Willamette Meridian, Washington
Sections 6, 7, 18, 19, 30 and 31

In T--39 N--R 45 E--Willamette Meridian, Washington
Sections 1, 12, 13, 14, 23, 24, 25, 26, and 36

Accessibility

A good horse trail parallels Hughes Fork thru this area. It is kept up in good condition by the Forest Service.

An excellent site for a base camp for four crews is situated on the west side of Hughes Fork, near the N. W. corner of Section 17, T 64 N--R 5 W in the edge of overmature trees. This site was used by Reconnaissance Crews in 1924. Water facilities are good. There is little ground cover, wood is plentiful. This site is about 12 miles by trail from the head of the little lake.

For working the area north of this point, a possible fly camp might be located between the East and West branches of Hughes Fork. There is no trail to this point, and the going is hard due to bush and windfall. It would be necessary to construct a trail.

Below the base camp site to Big Creek, good camp sites are scarce. The water in Hughes Fork sinks in the ground during the summer from about the section line between 16 and 21, south to the south west corner of Section 21. Early in the season water is present and camping conditions are good at the junction of the Hughes Fork trail and trail to Priest River, in the north west quarter of Section 21.

At Hughes Meadow R. S., there are poor facilities for a large camp. The water available is in a dug out spring.

A good camp site for a base camp is on Quartz Creek near the main Hughes Fork trail in center of Section 32.

On Big Creek there is a good camp site in the south west corner of Section 20 between north and south forks of Big Creek. There is an old fire trail up to this point, which could be cleaned out and made into a horse trail. Suitable fly camp sites are found up each fork of Big Creek.

There are good camp sites up each fork of Quartz Creek.

In T--63 N--R 5 W--Boise Meridian, Idaho
Sections 5 and 6

In T--40 N--R 46 E--Willamette Meridian, Washington
Sections 30 and 31

In T--40 N--R 45 E--Willamette Meridian, Washington
Section 36

In T--39 N--R 46 E--Willamette Meridian, Washington
Sections 6, 7, 18, 19, 30 and 31

In T--39 N--R 45 E--Willamette Meridian, Washington
Sections 1, 12, 13, 14, 23, 24, 25, 26, and 36

Accessibility

A good horse trail parallels Hughes Fork thru this area. It is kept up in good condition by the Forest Service.

An excellent site for a base camp for four crews is situated on the west side of Hughes Fork, near the N. W. corner of Section 17, T 64 N--R 5 W in the edge of overmature trees. This site was used by Reconnaissance Crews in 1924. Water facilities are good. There is little ground cover, wood is plentiful. This site is about 12 miles by trail from the head of the little lake.

For working the area north of this point, a possible fly camp might be located between the East and West branches of Hughes Fork. There is no trail to this point, and the going is hard due to brush and windfall. It would be necessary to construct a trail.

Below the base camp site to Big Creek, good camp sites are scarce. The water in Hughes Fork sinks in the ground during the summer from about the section line between 16 and 21, south to the south west corner of Section 21. Early in the season water is present and camping conditions are good at the junction of the Hughes Fork trail and trail to Priest River, in the north west quarter of Section 21.

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A good camp site for a base camp is on Quartz Creek near the main Hughes Fork trail in center of Section 32.

On Big Creek there is a good camp site in the south west corner of Section 20 between north and south forks of Big Creek. There is an old fire trail up to this point, which could be cleared out and made into a horse trail. Suitable fly camp sites are found up each fork of Big Creek.

There are good camp sites up each fork of Quartz Creek.

Table 21 shows the acreages of the different timber age classes and eradication types.

TABLE XXI
Number of Acres by Timber Age Classes and Eradication Types in Hughes Fork Area

Timber Age Class	Eradication Types—Acres								% of Acres in each Timber Age Class.
	1	2	3	4	5	6	7	Total	
0-10	--	--	--	--	--	11	-	11	.1
11-20	80	--	--	--	--	3625	-	3705	34.1
21-40	68	--	1046	--	257	--	-	1371	12.6
41-60	192	--	1543	--	--	--	-	1735	16.0
61-80	--	--	--	--	53	--	-	53	.5
81-100	61	--	--	289	--	--	-	350	3.2
101-200	289	2654	131	--	--	--	43	3117	28.7
200+	92	431	--	--	--	--	-	523	4.8
Total	782	3085	2720	289	310	3636	43	10865	
% of Acres in each Eradication Type	7.2	28.4	25.0	2.7	2.3	33.5	.4		100.0

An examination of Table 21 shows that over 1/3 of the area is occupied by a 10-20 year timber age class.

Table 22 shows the eradication factors per acre for the different eradication types in each timber age class.

TABLE XXII
Eradication Factors per Acre by Timber Age Classes, and Eradication Types for Hughes Fork Area.

Timber Stand: Age Class	Timber Stand: Composition	Eradication Type	Acres	Chains of reconnaissance strips	Timber per Acre: Mature: White Pine: Ave. DBH in inches	Mature: White Pine: No.	Mature: Mixed No.	Poles: White Pine No.	Poles: Mixed No.	Reprod.: White Pine No.	Reprod.: Mixed No.	Ribes per Acre: R. lac.	Ribes per Acre: R. viscoss.	Ribes per Acre: Total	Brush: Genera	Brush: Height Ft.	Brush: Density	Windfall	Visibility
0-10	WP-C-H	6	11	1	----	--	--	--	--	120	80	--	120	120	Vac-Sal-Ep	3	40	--	8
10-	C-H-DF-WP	1	80	5	----	--	--	--	--	8	No Data	64	--	64	Aln-Sal-Ep	3	50	L	11
20.	WP-WF-C-H-LP-L (30% W.P.)	6	3625	687	---	½	1	8	No Data	107	No Data	7	32	39	Sal-Ep-Aln	3	30	H	15
Total	WP-WF-C-H-LP-L		3705	692	18"-22"	½	1	8	No	105	No	7	32	39	Sal-Ep-A ln	3	30	H	15
20-	WP-C-H	1	68	14	------	23	14	34	90	11	1347	69	6	75	Aln-Sal-Rub	5	41	--	8
	WP-C-WF-S-H	3	1046	466	-----	36	12	97	89	144	1094	7	10	17	Sal-Aln-Rub-Vac	4& 2/3	37	L	9
40.	WF-C-H-WP-DFSS	5	257	99	----	3	7	28	No Data	32	No Data	2	½	2½	Aln-Tax-Pac-Sal	4	21	L	12
Total	WP-WF-C-H-DFSS		1311	579	10"-12"	30	11	81	37	116	1081	8	8	16	Sal-Aln-Rub-Vac-Tax	4½	34	L	9
40-	C-WP-H	1	192	22	-----	18	48	25	153	48	1138	93	4	97	Aln-Sal-Rub	5	41	--	6
60.	WP-H-C-DF-WF-S	3	1543	767	-------	24	36	66	181	106	901	14	12	26	Aln-Sal-Pac-Vac	5	37	--	9
Total	WP-C-H-DF-WF-S	All	1735	789	12"-14"	24	37	65	180	103	909	16	12	28	Aln-Sal-Pac-Rub-Vac	5	38	--	9
60- 80.	WP-H-DF-WF	5	53	106	-----	--	5	126	No Data	36	No Data	1	2	3	Vac-Tax-Lon	3	12	M	23
80-	C-H-S-WP	1	61	5	------	--	50	40	90	--	1050	144	--	144	Ech-Vac	2½	56	--	4
100.	S-C-H-DF-WP-WF	4	289	51	-----	5½	76	7	85	13	288	38	--	38	Aln-Vac-Lon	3	38	--	7
Total	S-C-H-DF-WP-WF	All	350	56	16"--18"	5	74	9	85	11	343	46	--	46	Aln-Ech-Vac-Lon	3	40	--	7
100-	H-C	1	289	51	----	4	62	--	13	4	267	48	--	48	Ech-Tax-Vac	3½	36	--	10
	H-C-WP-WF-S	2	2654	891	----	6	71	2	70	3	272	1	--	1	Tax-Vac-Pac	2½	18	L	18
200.	C-S-WF-WP	3	131	22	----	22	80	--	200	--	133	13	9	22	Aln-Sal-Rub	5½	43	L	7
	WF-C-WP-H	7	43	14	----	7	60	--	No Data	--	No Data	69	--	69	Aln-Acer-Vac	4	40	--	9
Total	H-C-WP-WF-S		3117	978	20"-24"	6	70	2	123	3	393	4	Few	4	Tax-Vac-Aln-Vac-Ech	3	20		18
200 +	H-C-WP	1	92	34	-----	--	108	5	135	20	1149	77	--	77	A ln-Ech-Pac	3	30	L	9
	C-H-WP	2	431	60	-----	2	109	--	160	5	1250	4	--	4	Tax-Aln-Pac	3½	18	L	11
Total	C-H-WP		523	94	12"	1	109	3	138	10	1218	30	--	30	Tax-Aln-Ech-Pac	3	22	L	10

Note: On several of the reconnaissance strips no mixed pole and reproduction data were taken. These were omitted in the latter part of the season in order to gain time.

2

An examination of Table 22 discloses the following facts:

1. While mature white pine is found in every age class excepting the 0-10 year age class, there is not a large amount of white pine per acre ready to be cut.

2. The best stand of young white pine occurs in the 20-40 year age class. The average white pine over 8" D. B. H. here is a tree 11" D. B. H., 1½ sixteen foot logs high. Over 68% of the trees of 8" D. B. H. in this age class are white pine. Including the young mature and poles, it may be seen that 53% of the trees are white pines.

3. The mature white pine in the 10-20 year age class belongs to an **older** age class which survived the fire. There is also a very scattering overstory of larch.

4. From the small area studied in the 0-10 year age class, it is evident that white pine reproduction comes in readily in this location following a burn.

5. With the exception of the 100-200 year age class, ther number of Ribes per acre varied directly as the density of bush in each timber age class.

6. In general, the number of R. viscossissimum per acre decreased from 120 in the 0-10 year age class, to 2 in the 60-80 year age class Class. It may be noted that there were 9 R. viscossissimum per acre found in Type 3 in the 100-200 year age class. This portion of the mature stand is quite open, as evidenced by the high density of bush, 43%.

7. R. Lacustre is found in every timber age class, particularly along streams, and among rocks where there is seepage.

Table 23 shows the Ribes conditions by eradication types irrespective of timber age classes.

An examination of Table 22 discloses the following facts:

1. While mature white pine is found in every age class excepting the 0-10 year age class, there is not a large amount of white pine per acre ready to be cut.

2. The best stand of young white pine occurs in the 20-40 year age class. The average white pine over 8" D. B. H. here is a tree 11" D. B. H., 1½ sixteen foot logs high. Over 65% of the trees of 8" D. B. H. in this age class are white pine. Including the young mature and poles, it may be seen that 53% of the trees are white pines.

3. The mature white pine in the 10-20 year age class belongs to an older age class which survived the fire. There is also a very scattering overstory of larch.

4. From the small area studied in the 0-10 year age class, it is evident that white pine reproduction comes in readily in this location following a burn.

5. With the exception of the 100-200 year age class, the number of Ribes per acre varied directly as the density of bush in each timber age class.

6. In general, the number of R. viscosissimum per acre decreased from 120 in the 0-10 year age class, to 2 in the 60-80 year age class. It may be noted that there were 9 R. viscosissimum per acre found in Type 3 in the 100-200 year age class. This portion of the mature stand is quite open, as evidenced by the high density of bush, 43%.

7. R. Lacustre is found in every timber age class, particularly along streams, and among rocks where there is seepage.

Table 23 shows the Ribes conditions by eradication types irrespective of timber age classes.

TABLE XXIII

Summary of Ribes Conditions by Eradication Types, Hughes Fork Area

Eradication Type	Acres	Chains Studied	Ribes per Acre: R. lac.	R. visc.	Total	Brush: Genera	Ht. Ft.	Den. %	Windfell	Visibility (Feet)
1	782	131	70	2	72	Aln-Ech-Rub	$3\frac{1}{2}$	37	--	8
2	3085	951	1	--	1	Tax-Vac-Aln	3	18	L	17
3	2720	1255	11	11	22	Aln-Sal-Pac-Rub	5	37	L	9
4	289	51	38	--	38	Aln-Vac-Lon	3	38	--	7
5	310	205	2	1	3	Vac-Aln-Tax-Pac	3	17	--	17
6	3636	688	7	33	40	Sal-Ep-Aln	3	30	H	15
7	43	14	69	--	69	Aln-Acer-Vac	4	40	--	9
Total	10,865	3295	10	11	21					

An examination of Tables 22 and 23 indicates the following facts:

1. It is evident that timber type limits do not coincide with eradication type limits. The stream type, Eradication Type No. 1, occurs in every timber age class except the 0-10 year and 60-80 age classes. Eradication Type No. 2 is confined to the mature and overmature stands. Eradication Type 3 is confined mostly to the 20-40 and 40-60 year stands, with a small percentage in the mature stand. Eradication Type 4 is confined to the 80-100 year age class. Type 5 is confined cheifly to the 20-40 year age class, with a small amount of the thicket type in the 80-100 year age class. Type 6 is confined to areas of recent burns, where the bush is the chief ground cover. Type 7 lies entirely in mature timber.

2. The largest number of Ribes per acre is found along streams in Eradication Type 1. The least number occur in mature and overmature stands.

3. R. lacustre is found principally along streams, and associated with rock formations where seepage occurs near the surface.

TABLE XXIII

Summary of Ribes Conditions by Eradication Types, Hughes Fork Area

Erad-ication Type	Acres	Chains Studied	Ribes per Acre: R. lac.	R. visc.	Total	Brush: Genera	Ht. Ft.	Den. %	[illegible]	Visibility (feet)
1	782	131	70	2	72	Aln-Ech-Rub	3½	37	--	8
2	3045	951	1	--	1	Tax-Vac-Aln	3	18	L	17
3	2720	1255	11	11	22	A ln-Sal-Pse-Rub	5	37	L	9
4	259	51	38	--	38	Aln-Vac-Lon	3	38	--	7
5	310	205	2	1	3	Vac-Aln-Tax-Pse	3	17	--	17
6	3636	685	7	33	40	Sal-Eq-Aln	3	30	H	15
7	43	14	69	--	69	Aln-Acer-Vac	4	40	--	9
Total	10,855	3295	10	11	21					

An examination of Tables 22 and 23 indicates the following facts:

1. It is evident that timber type limits do not coincide with eradication type limits. The stream type, Eradication Type No. 1, occurs in every timber age class except the 0-10 year and 60-80 age classes. Eradication Type No. 2 is confined to the mature and overmature stands. Eradication Type 3 is confined mostly to the 20-40 and 40-60 year stands, with a small percentage in the mature stand. Eradication Type 4 is confined to the 80-100 year age class. Type 5 is confined cheifly to the 20-40 year age class, with a small amount of the thicket type in the 80-100 year age class. Type 6 is confined to areas of recent burns, where the bush is the chief ground cover. Type 7 lies entirely in mature timber.

2. The largest number of Ribes per acre is found along streams in Eradication Type 1. The least number occur in mature and overmature stands.

3. R. lacustre is found principally along streams, and associated with rock formations where seepage occurs near the surface.

4. R. viscossissimum is found most abundantly in the young age classes, where there is the least possibility of shading out by coniferous growth. The fact that there is such a large acreage of young reproduction stands supporting an average of 33 R. viscossissimum per acre, accounts for the fact that there was more R. viscossissimum than R. lacustre on the entire area.

5. In general, the greatest number of Ribes per acre occur where the density of brush is greatest.

6. The areas showing the largests number of Ribes per acre, also show Alnus sp. and Salix sp. as the predominant bush.

IV General Summary of Conditions on all Federal Lands Reconnaissanced.

Table 24 shows the number of acres of Federal land reconnaissanced in 1924, and the % of total in each timber age class and eradication type.

TABLE XXIV
Number of Acres by Eradication Types and Timber Age Classes on all Federal Land Reconnaissanced in 1924.

Timber Age Class (Years)	Eradication Types in Acres: 1	2	3	4	5	6	7	Total	Percent in each Timber class.
0-10	--	--	--	--	--	11		11	---
10-20	84	--	133	--	--	3625	-	3842	17.4
20-40	319	--	2421	1546	669	--	-	4955	22.4
40-60	224	--	2257	308	37	--	-	2826	12.8
60-80	--	--	--	--	53	--	-	53	.22
80-100	61	--	--	289	--	--	-	350	1.6
100-200	685	5345	900	59	--	--	43	7532	34.1
200 +	418	2032	--	87	--	--	-	2537	11.5
Total	1791	7877	5711	2289	759	3633	43	22,106	
% in each Eradication Type	8.1	35.6	25.8	10.4	3.4	16.4	.2		100.0

1. It may be noticed in the above tabulation, that over 1/3 of the total acreage is in Ribes free, mature timber stand.

2. The next largest area in an eradication type occurs in Type 3, in the 20-40 timber age class.

4. R. viscosissimum is found most abundantly in the young age classes, where there is the least possibility of shading out by coniferous growth. The fact that there is such a large acreage of young reproduction stands supporting an average of 33 R. viscosissimum per acre, accounts for the fact that there was more R. viscosissimum than R. lacustre on the entire area.

5. In general, the greatest number of Ribes per acre occur where the density of brush is greatest.

6. The areas showing the largest number of Ribes per acre, also show Alnus sp. and Salix sp. as the predominant bush.

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Timber Age Class (Years)	Eradication Types in Acres: 1	2	3	4	5	6	7	Total	Percent in each Timber class.
0-10	--	--	--	--	--	11		11	--
10-20	84	--	173	--	--	3625	-	3842	17.4
20-40	319	--	2421	1516	669	--	-	4925	22.4
40-60	224	--	2257	308	37	--	-	2826	12.8
60-80	--	--	--	--	53	--	-	53	.12
80-100	61	--	--	289	--	--	-	350	1.6
100-200	685	5845	900	59	--	--	43	7532	34.1
200 +	418	2032	--	87	--	--	-	2537	11.5
Total	1791	7877	5711	2259	759	3636	43	22,105	
% in each Eradication Type	8.1	35.6	25.8	10.2	3.4	16.4	.2	100.0	

1. It may be noticed in the above tabulation, that over 1/3 of the total acreage is in Ribes free, mature timber stand.

2. The next largest area in an eradication type occurs in Type 3, in the 20-40 timber age class.

TABLE XXV

Summary of Conditions by Timber Age Classes for all Federal Lands Reconnaissanced

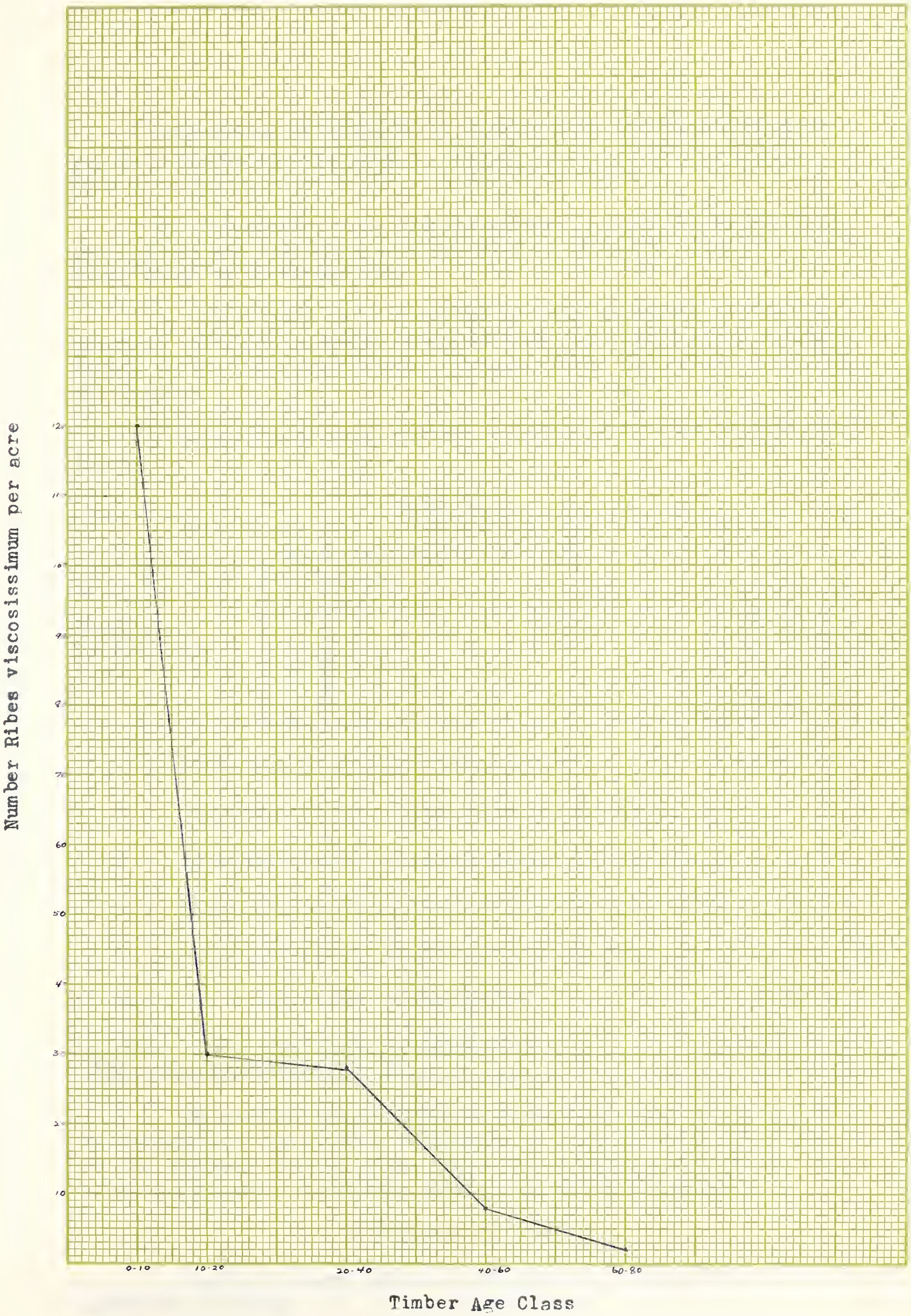
Timber Stand		Eradication Type	Acres	Chains studied	Timber per Acre							Ribes per Acre			Brush			Windfall	Visibility
					Mature			Poles		Reprod.									
					White Pine														
Age Class	Composition				Ave. DBH in inches	No.	Mixed No.	White Pine No.	Mixed No.	White Pine No.	Mixed No.	Lac.	Viscoss.	Total	Genera	Height Ft.	Density		
0-10	WP-C-H	6	11	1	---	-	--	---	--	120	80	-	120	120	Vac-Sal-Ep	3	40	--	8
10-20	WP-WF-DF-C-H-S-LP-L	All	3842	778	24"	½	4	7	49	144	2339	12	30	42	Sal-Ep-Aln	3	28	H	13
20-40	WP-C-WF-DF H-S	All	4955	2212	10"-12"	14	16	66	84	267	2366	16	28	44	Aln-Sal-Pac-Rub	4	30	L	8
40-60	WP-C-H-DF-WF-LP-S	All	2826	1099	12"-14"	33	33	85	200	106	1362	12	8	20	Aln-Sal-Rub-Pac Vac	5	31	--	9
60-80	WP-H-DF-WF	All	53	106	---	--	5	126	?	36	?	1	2	3	Vac-Tax-Lon	3	12	M	23
80-100	S-C-H-DF-WP-WF	All	350	56	---	5	74	9	85	11	343	46	--	46	Aln-Ech-Vac-Lon	3	40	--	7
100-200	WP-H-C-WF-DF-S	All	7532	2399	16"-24"	21	101	6	112	17	504	11	--	11	Pac-Tax-Vac-Rub Aln-Ech	$2\frac{1}{2}$	19	--	17
200 +	C-H-WP	All	2537	427	22"-28"	6	113	4	96	3	738	18	--	18	Tax-Pac-Ech-Vac Aln-Sal-Ferns	3	25	L	12
Total			22,106	7078								14	13	27					

TABLE XXV

Summary of Conditions by Timber Age Classes for all Federal Lands Reconnaissanced

Timber Stand: Age Class	Timber Stand: Composition	Eradication Type	Acres	Chains studied	Timber per Acre: Mature: White Pine Ave. DBH in inches	Mature: White Pine No.	Mature: Mixed No.	Poles: White Pine No.	Poles: Mixed No.	Reprod.: White Pine No.	Reprod.: Mixed No.	Ribes per Acre: Lac.	Ribes per Acre: Viscoss.	Ribes per Acre: Total	Brush: Genera	Brush: Height Ft.	Brush: Density	Windfall	Visibility
0-10	WP-C-H	6	11	1	---	-	--	--	--	120	90	-	120	120	Vac-Sal-Pg	3	40	--	3
10-20	WP-WH-DF-C-H-S-LP-L	All	3542	778	24"	½	4	7	49	144	2336	12	30	42	Sal-Rt-Aln	3	25	H	13
20-40	WP-C-WP-DF-H-S	All	4955	2212	10"-12"	14	15	66	84	267	2556	16	28	44	Aln-Sal-Pec-Rub	4	30	L	3
40-60	WP-C-H-DF-H-L-S	All	2825	1095	12"-14"	33	53	85	200	106	1562	12	8	20	Aln-Sal-Rub-Pec-Vac	5	51	--	9
60-80	LP-H-DF-WP	All	53	106	---	--	5	126	?	76	?	1	2	3	Vac-Tax-Lon	3	12	M	23
80-100	S-C-H-DH-WP-WP	All	350	56	---	5	74	9	85	11	343	46	--	46	Aln-Ech-Vac-Lon	3	40	--	7
100-200	WP-H-C-WP-DF-S	All	7532	2799	16"-24"	21	101	6	112	17	504	11	--	11	Pec-Tax-Vac-Rub-Aln-Ech	2½	19	--	17
200 +	C-H-WP	All	2537	427	22"-28"	6	113	4	96	3	738	13	--	13	Tax-Pac-Ech-Vac-Aln-Sal-Ferns	3	25	L	12
Total			22,106	7078								14	13	27					

Showing number of R. viscosissimum in different age classes.



1. Referring to Table 25 it appears that the number of Ribes per acre increases with density of bush up to a density of 40%. This is logical, since Ribes is a deciduous bush.

2. The number of R. viscossissimum is greatest in the 0-10 year class, and decreases to 2 per acre in the 60-80 year age class, after which it is shaded out.

3. The number of R. lacustre is more dependent on abundant moisture conditions, and is found in every age class along streams, except in the 0-10 year stand. In this latter age class, no stream was found.

Table 26, shows a summary of Ribes conditions by eradication types.

TABLE XXVI
Ribes Conditions by Eradication Types on Federal Area Reconnaissance, 1924.

Eradication Type	Acres	Chains studied	Ribes per Acre: R. lac.	R. viscoss.	Total	Brush: Genera	Height Ft.	Density %	Windfall	Visibility (Feet)
1	1791	461	88	1½	89½	Rub-Aln-Sal-Ech	3½	35	--	9
2	7877	2323	2	--	2	Pac-Tax-Vac-Aln-Rub-Ech	2	17	L	17
3	5711	2128	14	24	38	Aln-Sal-Acer-Rub-Pac-Vac	4	54	M	8
4	2289	812	12	12	24	Rub-Aln-Sal-Vac-Pac-Tax-Lon	4	29	M	9
5	759	652	3	14	17	Pac-Vac-Aln-Rub-Tax	3	14	L	14
6	3633	688	7	33	40	Sal-Ep-Aln	3	30	H	15
7	43	14	69	--	69	Aln-Acer-Vac	4	40	--	9
All	22,106	7078	14	13	27					

An examination of Table 26 shows that over 1/3 of the area lies in Eradication Type 2 with an average of 2 R. lacustre per acre. This is the cheapest type to work. Eradication Type 1, the stream type, probably the most expensive, covers only 8% of the area.

V Analysis of Time

Table 27 shows how the time spent on reconnaissance on Federal lands was divided.

TABLE XXVII
Analysis of Reconnaissance Time Spent on Federal Lands,
June 16, 1924 to Sept. 14, 1924

Type of Work	Man Days		Percentages	
Reconnaissance Strips	239½		41.4	
Traverse	26		4.5	
Mapping	38½		6.7	
Training	83		14.3	
Total actual work		387		66.9
Travel, Camp Making, Packing	98	98	17.0	17.0
Rain	36		6.2	
Sundays, Holidays	57		9.9	
Total no work		93		16.1
Grand Total	578	578	100	100

In addition to the above time, and not included in it, is an item of 55½ days spent in fighting fires, paid for by the Forest Service, except 2½ days of Supervisor's time paid for by Office of Blister Rust Control. Nearly 9% of the time was devoted to fire fighting. The men were on 8 different fires during the summer.

From Table 27 certain observations may be made.

1. There was a relatively high percentage of time, 14%, spent in training the men. This was due to the fact that to all the reconnaissance men, this work was entirely new. In order to obtain the right perspective for blister rust reconnaissance, it was necessary for the men to work in eradication crews for several days. At the end of the training period, the men consecutively ran the same reconnaissance strip. The results were compared and talked over, with the end in view of correlating data taken by each crew. On the first of August, the idea of eradication types was evolved. The reconnaissance men worked in the eradication crews for two or three days on the different eradication types in order to become familiar with such types. In future work it is probably that it will not be necessary to devote so much time to training men.

2. Practically 67% of the time was spent in actual work giving results on the ground.

3. 17% of the time was devoted to travel, making camps, back packing, carrying supplies etc. Camps had to be moved quite often in order to cut down time spent in walking to and from work. The men

established seven camps during the reconnaissance season. Camp sanitation was taken care of following Forest Service rules, by constructing suitable latrines and burying all tin cans and camp refuse. Considerable time was also spent in bringing in supplies by back packing to camps not reached by horse trails.

VI Costs of Reconnaissance

Table 28 gives the salary, subsistence and transportation costs of the men.

TABLE XXVIII

Costs of Reconnaissance Men Working on Federal Lands

No. Men	Position	Monthly Salary	No. of days	Total Salary	Subsistence	Transport	Total Expense
1	a-Supervisor	225.00	50	375.00	54.37	8.85	438.22
1	Recorder	100.00	85	283.33	92.06	9.80	385.19
1	"	100.00	74	246.67	77.69	9.80	334.16
1	"	90.00	72	216.00	77.12	9.80	302.92
1	"	90.00	39	117.00	45.83	4.90	167.73
1	Mapper	90.00	29	78.08	34.67	b.----	112.75
1	Helper	70.00	26	60.67	34.56	4.90	100.13
1	"	70.00	79	184.33	90.12	9.80	284.25
1	"	70.00	$55\frac{1}{2}$	129.50	54.74	9.80	194.04
1	"	70.00	11	25.67	12.38	b.----	38.05
1	"	70.00	60	140.00	63.52	4.90	208.42
	Total	---	c-$580\frac{1}{2}$	1856.25	637.06	72.55	2565.86

a.--Represents half of Supervisor's time. Remainder charged to reconnaissance work on State lands.

b.--Transportation paid for by Eradication.

c.--Total includes $2\frac{1}{2}$ days of fire fighting done by Supervisor and paid for by this Office.

Subsistence costs are based on the following costs per man day:

Cost per day, cook furnished -- $1.23
Cost per day, without cooking charge--.97

The subsistence cost includes the transportation charges of the food supplies.

TABLE XXIX

Total Costs, Reconnaissance, Federal Lands

Items	Costs
Salaries	$1856.25
Subsistence	637.06
Transportation	72.55
20% of Property	35.70
Total	2601.56

Property consisted of non-expendable supplies such as scientific instruments, bedding, tents, etc., used by reconnaissance men working on federal lands. 20% of the total was charged against this year.

Cost per acre--$\frac{\$2601.56}{22106 \text{ acres}}$--$.117 per acre

D.(3.52) Results of Control Reconnaissance on Two Areas in the Priest Lake Timber Protective Association Lands, Ida.

During the summer of 1924 there were four crews of two men each doing control reconnaissance on lands in the Priest Lake Timber Protective Association. Four of the men were paid by the Association, and four by this Office. One of the crews, besides doing reconnaissance work, was also doing educational work among the field employees of the Association. All four crews were scouting for the disease. The crew doing educational work reconnaissanced 7 small areas, in different parts of the Association while the remaining 3 crews confined their efforts to making a reconnaissance of two larger areas. A summary of all the reconnaissance work done in the Association is given on page 159 "Results of Summer's Wor,k on Priest Lake Timber Protective Association."

This report gives in a more detailed way the results of reconnaissance performed by the 3 crews on the two large areas. These two areas are as follows:

Area No. 1--East of Upper Priest River	9108 Acres
Area No. 2--Two Mouth Creek Drainage	11,224 Acres

I Area No. 1 East of Upper Priest River

This area occupies all or part of the following sections:

T. 64 N--R. 4W--Boise Meridian, Idaho
Sections 17, 18, 19, 20, 30 and 31

T. 64 N--R. 5W--Boise Meridian
Sections 22, 23, 24, 25, 26, 27, 34, 35 and 36.

T. 63 N--R. 4W--Boise Meridian
Sections 6, 7, and 18

T. 63 N--R. 5W
Sections 1, 2, 3, 11, 12 and 13

The location and limits of this area are shown on the map.

Accessibility

A good horse trail runs thru this area from the head of Upper Priest Lake north paralleling Upper Priest River $\frac{1}{4}$ to $\frac{1}{2}$ mile east of it.

Property consisted of non-expendable supplies such as scientific instruments, bedding, tents, etc., used by reconnaissance men working on federal lands. 20% of the total was charged against this year.

Cost per acre--$\frac{\$2601.56}{22106 \text{ acres}}$--.117 per acre

(3.83) Results of Control Reconnaissance on Two Areas in the Priest Lake Timber Protective Association Lands, Ida.

During the summer of 1924 there were four crews of two men each doing control reconnaissance on lands in the Priest Lake Timber Protective Association. Four of the men were paid by the Association, and four by this Office. One of the crews, besides doing reconnaissance work, was also doing educational work among the field employees of the Association. All four crews were scouting for the disease. The crew doing educational work reconnaissanced 7 small areas, in different parts of the Association while the remaining 3 crews confined their efforts to making a reconnaissance of two larger areas. A summary of all the reconnaissance work done in the Association is given on page 159 "Results of Summer's Work on Priest Lake Timber Protective Association."

This report gives in a more detailed way the results of reconnaissance performed by the 3 crews on the two large areas. These two areas are as follows:

Area No. 1-- East of Upper Priest River 5100 Acres
Area No. 2--Two Mouth Creek Drainage 11,334 Acres

I Area No. 1 East of Upper Priest River

This area occupies all or part of the following sections:

T. 64 N--R. 4--Boise Meridian, Idaho
Sections 17, 18, 19, 20, 30 and 31

T. 64 N--R. 5--Boise Meridian
Sections 22, 23, 24, 25, 26, 27, 34, 35 and 36.

T. 63 N--R. 4 --Boise Meridian
Sections 6, 7, and 18

T. 63 N--R. 5.
Sections 1, 2, 3, 11, 12 and 13

The location and limits of this area are shown on the map.

Accessibility

A good horse trail runs thru this area from the head of Upper Priest Lake north paralleling Upper Priest River ½ to 1 mile east of it.

The northern portions of the area could well be worked from a camp on Cedar Creek at the trail crossing in the western half of Section 23.

Another excellent camp site on Cedar Creek is on the trail to Continental Mine at McLean Mine, Section 13, where there are two deserted cabins, one of which has a cook stove and fireplace. There is a good spring of water near by.

Good camp sites occur in Section 18 on the south fork of Cedar Creek. It would be necessary to construct a trail up the south fork.

South of Cedar Creek to Upper Priest Lake there are no good camp sites, along the trail owing to the scarcity of water. Both Snow and Ruby Creeks dry up in the summer time near their mouths. To cover the western portions of the area it would be necessary to construct trails west of the main trail, and make camps on the Upper Priest River, along which there are several good camp sites.

On Ruby Creek, near the eastern boundary of Section 2, is a good site for a base camp. About ¼ mile of trail would necessarily be constructed to connect the camp with the main trail.

It is difficult going up either Snow or Ruby Creeks. Probably it would be necessary to depend on fly camps to cover the upper portions of either of these streams.

Acres Reconnaissanced

Table 30 shows the number of acres of each eradication type in each timber age class.

TABLE XXX

Number of Acres Reconnaissanced by Eradication Types and Timber Age Classes in Area No 1 -- East of Upper Priest River

Age Class Timber	Eradication Type 1	2	3	4	6	Total	% of area in each Timber Age Class
0-10	77	--	304	--	151	538	5.9
10-20	212	--	1394	3098	--	4704	51.7
20-40	10	--	287	425	--	722	7.9
40-60	5	491	--	--	--	496	5.4
100-200	372	1120	--	--	--	1492	16.4
200 +	258	898	--	--	--	1156	12.7
Total	934	2509	1985	3523	157	9108	
% of total area in each Erad. type	10.3	27.5	21.8	38.7	1.7		100

The following facts may be observed from Table 30.

1. Over half of the total area is occupied by a 10-20 year timber age class.

2. Nearly 39% of the acreage is in Eradication Type No. 4.

3. Eradication type limits and timber age class limits do notnecessarily co-incide.

White Pine and Ribes Factors.

Tables 31 and 32 show the white pine and Ribes conditions on the area.

TA BLE XXXI

White Pine and Ribes Conditions per Acre by Timber Age Classes and Eradication Types, Priest Lake Timber Protective Association Lands East of Upper Priest River.

Timber Stand: Age Class (Years)	Timber Stand: Composition	Eradication Type	Acres	Chains studied	Timber per Acre: Mature White Pine: Volume Bd.Feet	Timber per Acre: Mature White Pine: No	Timber per Acre: Mixed No	Poles: White Pine No.	Poles: Mixed No	Reproduction: White Pine No.	Reproduction: Mixed No	R. per Acre: R. lac.	R. per Acre: R. viscoss.	R. per Acre: Total	Brush: Genera	Brush: Height Ft.	Brush: Density %	Windfall	Visibility (Feet)
0–	WP-WF-H-S	1	77	25	---	---	3	---	---	82	353	29	---	29	Sal-Pac	2	8	L	11
10.	C-H-WP	3	304	72	---	---	---	8	3	100	510	---	---	---	Sal-Pac-Cean.	5	26	M	13
	WP-C-H-	6	157	33	---	3	5	50	34	311	1428	15	34	49	Sal	4	33	M	10
Ave.	WP-C-H-WF-S	All	538	130	14"-16"	1	2	20	11	159	569	9	10	19	Sal-Pac-Cean	4	30	M	12
10–	WP-C-H	1	212	77	---	$2\frac{1}{3}$	4	25	42	147	1000	8	---	8	Pac-Sal-Aln	3	22	L	8
20.	Wp-H-C	3	1394	313	---	$\frac{1}{2}$	4	9	32	249	1657	25	19	44	Sal-Pac	4	29	H	7
	WP-C-H-S	4	3098	321	---	1	4	14	16	274	1134	9	15	24	Sal-Pac-Aln	4	28	M	11
Ave.	Wp-C-H-S	All	4704	711	8-10	1	4	13	22	259	1283	14	16	30	Sal-Pac-Aln	4	28	M	10
20–	C-WP	1	10	3	---	---	6	15	27	60	507	125	---	125	Pac-Ferns	4	36	L	8
40.	C-H-WP-DF	3	287	99	---	2	12	50	74	74	2438	12	12	24	Pac-Vac-Rub	3	23	M	7
	W P-C-H-DF	4	425	31	---	4	7	52	82	88	518	1	22	23	Pac-Sal	4	31	M	11
Ave.	C-WP-H-DF	All	722	133	8"-12"	3	9	51	78	82	1281	7	18	25	Pac-Sal-Vac-Rub-Ferns	4	35	M	9
40–	H	1	5	3	---	---	86	---	29	---	1186	---	---	---	Tax-Ech	3	20	L	18
60.	C-H-WP	2	491	108	---	1	106	3	118	18	2990	---	---	---	Pac-Tax	2	15	L	16
Ave.	C-H-WP		496	111	12-14	1	105	3	116	18	2950	---	---	---	Pac-Tax-Ech	3	16	L	16
100–	C-H-WP	1	372	261	---	11	100	11	91	16	528	332	Few	332	Pac-Vac-Ferns	3	25	L	8
200.	C-H-WP	2	1120	275	---	11	40	6	58	34	671	1	---	1	Pac-Vac	2	24	L	11
Ave.	C-H-WP		1492	536	20-26	11	55	7	67	29	632	83	---	83	Pac-Vac-Ferns	3	25	L	10
200 +	C-H-WP	1	258	78	---	$2\frac{1}{2}$	107	4	140	97	1180	16	---	16	Rub-Tax-Ferns	4	27	L	11
	C-H-WP	2	898	168	---	$1\frac{1}{2}$	111	1	154	2	535	---	---	---	Ferns-Pac-Ech	2	24	L	11
Ave.	C-H-WP	All	1156	246	28-34	2	110	2	151	23	679	4	---	4	Ferns-Rub-Pac-Tax-Ech	3	25	L	11
Grand Totals			9108	1867								22	10	32					

TABLE XXXI

White Pine and Ribes Conditions per Acre by Timber Age Classes and Eradication Types, Priest Lake Timber Protective Association Lands East of Upper Priest River.

Timber Stand: Age Class (Years)	Timber Stand: Composition	Eradication Type	Acres	Chains studied	Timber per Acre: Mature: White Pine: Volume Bd. Feet	Mature: White Pine: No.	Mature: Mixed No.	Poles: White Pine No.	Poles: Mixed No.	Reproduction: White Pine No.	Reproduction: Mixed No.	R. per Acre: R. lac.	R. per Acre: R. viscoss.	R. per Acre: Total	Brush: Genera	Brush: Height Ft.	Brush: Density %	Windfall	Visibility (Feet)
0-	WP-WF-H-S	1	77	25	---	---	3	---	---	82	333	29	---	29	Sal-Pac	2	8	L	11
10.	C-H-WP	3	304	72	---	---	--	8	3	100	510	--	--	--	Sal-Pac-Cean.	5	26	M	13
	WP-C-H-	6	157	33	---	3	5	50	34	311	1428	15	34	49	Sal	4	33	M	10
Ave.	WP-C-H-WF-S	All	538	130	14"-16"	1	2	20	11	159	569	9	10	19	Sal-Pac-Cean	4	30	M	12
10-	WP-C-H	1	212	77	---	2½	4	25	42	147	1000	8	--	8	Pac-Sal-Aln	3	22	L	8
20.	WP-H-C	3	1394	313	---	½	4	9	35	249	1657	25	19	44	Sal-Pac	4	29	H	7
	WP-C-H-S	4	3098	321	---	1	4	14	16	274	1134	9	15	24	Sal-Pac-Aln	4	28	M	11
Ave.	WP-C-H-S	All	4704	711	8-10	1	4	13	22	259	1283	14	16	30	Sal-Pac-Aln	4	28	M	10
20-	C-WP	1	10	3	---	---	6	15	27	60	507	125	--	125	Pac-Ferns	4	36	L	8
40.	C-H-WP-DF	3	287	99	---	2	12	50	74	74	2438	12	12	24	Pac-Vac-Rub	3	23	M	7
	WP-C-H-DF	4	425	31	---	4	7	52	82	88	518	1	22	23	Pac-Sal	4	31	M	11
Ave.	C-WP-H-DF	All	722	133	8"-12"	3	9	21	78	32	1281	7	18	25	Pac-Sal-Vac-Rub-Ferns	4	35	M	9
40-	H	1	5	3	---	--	89	---	29	----	1189	--	--	--	Tax-Ech	3	20	L	18
60.	C-H-WP	2	491	108	---	1	106	3	118	18	2990	--	--	--	Pac-Tax	2	15	L	16
Ave.	C-H-WP		496	111	12-14	1	105	3	116	18	2950	--	--	--	Pac-Tax-Ech	3	16	L	16
100-	C-H-WP	1	372	261	---	11	100	11	91	16	528	335	Few	335	Pac-Vac-Ferns	3	25	L	8
200.	C-H-WP	2	1120	275	---	11	40	6	28	34	671	1	--	1	Pac-Vac	2	24	L	11
Ave.	C-H-WP		1492	536	20-26	11	55	7	61	29	635	83	--	83	Pac-Vac-Ferns	3	25	L	10
200 +	C-H-WP	1	258	78	---	2½	107	4	140	97	1180	16	--	16	Rub-Tax-Ferns	4	27	L	11
	C-H-WF	2	898	168	---	1½	111	1	154	5	535	--	--	--	Ferns-Pac-Ech	2	24	L	11
Ave.	C-H-WP	All	1156	246	28-34	2	110	2	121	23	679	4	--	4	Ferns-Rub-Pac-Tax-Ech	3	25	L	11
Grand Totals			9108	1867								22	10	32					

Explanation of abbreviations used in all tables.

Timber

C--cedar; D.F.--Douglas fir; H.--hemlock; S.--spruce; W.P.--white pine; W.F.--white fir; L.--larch; L.P.--lodgepole pine.

Brush

Acer--Acer circinatum--vine maple
Aln --Alnus species--alder
Cean--Ceanothus species--buck brush
Ech --Echinopanax horridum--Devils Club
Ep --Epilobium angustifolium--Fireweed
Lon --Lonicera spp.--wild honeysuckle
Menz--Menziesia ferruginea
Pac --Pachistima myrsinites
Rhod--Rhododendron Albiflorium
Rub --Rubus species--thimbleberry, raspberry
Sal --Salix species--willow
Tax --Taxus brevifolia--western yew
Vac --Vaccinium spp.--huckleberry

Windfall

H--Heavy windfall
M--Medium windfall
L--Light windfall
-- Windfall practically absent

Ribes

R. viscoss.--R. viscossissimum
R. lac. --R. lacustre
R. acer. --R. acerifolium

An examination of Table 31 shows the following conditions:

1. On this area, the best stand of white pine consisting of poles and reproduction is found in the 0-10, and 10-20 year age classes.

2. The best stand of mature white pine occurs in the 100-200 year age class, where it constitutes 17% of the mature trees.

3. White pine poles and reproduction are scarce in the 100-200 and 200 + year age classes.

4. The largest number of Ribes per acre are found in the mature stand along streams, in which situations there were found 332 R. lacustre per acre.

5. No Ribes and few white pine were found in the 40-60 year age class.

Explanation of abbreviations used in all tables.

Timber

C--cedar; D.F.--Douglas fir; H.--hemlock; S.--spruce; W.P.--white pine; W.F.--white fir; L.--larch; L.P.--lodgepole pine.

Brush

Acer--Acer circinatum--vine maple
Aln --Alnus species--alder
Cean--Ceanothus species--buck brush
Ech --Echinopanax horridum--Devils Club
Ep --Epilobium angustifolium--Fireweed
Lon --Lonicera spp.--wild honeysuckle
Menz--Menziesia ferruginea
Pac --Pachistima myrsinites
Rhod--Rhododendron Albiflorium
Rub --Rub species--thimbleberry, raspberry
Sal --Salix species--willow
Tax --Taxus brevifolia--western yew
Vac --Vaccinium spp.--huckleberry

Windfall

H--Heavy windfall
M--Medium windfall
L--Light windfall
-- Windfall practically absent

Ribes

R. viscoss.--R. viscosissimum
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R. acer. --R. acerifolium

An examination of Table 31 shows the following conditions:

1. On this area, the best stand of white pine consisting of poles and reproduction is found in the 0-10, and 10-20 year age classes.

2. The best stand of mature white pine occurs in the 100-200 year age class, where it constitutes 17% of the mature trees.

3. White pine poles and reproduction are scarce in the 100-200 and 200 + year age classes.

4. The largest number of Ribes per acre are found in the matu stand along streams, in which situations there were found 372 R. lacustre per acre.

5. No Ribes and few white pine were found in the 40-60 year age class.

6. Practically no R. viscossimimum was found in timber age classes older than the 20-40 year age class.

7. R. lacustre was found in every timber age class except the 40-60 year age class, chiefly along streams.

Table 32 gives a summary of Ribes conditions by eradication types on this area.

TABLE XXXII

Ribes per Acre by Eradication Types Priest Lake Timber Protective Association, East of Upper Priest River

Erad. Type	Acres	Chains of Reconn. Strips	Ribes per Acre: R. lac.	Ribes per Acre: R. vis-coss.	Ribes per Acre: Total	Brush: Genera	Brush: Ht. Ft.	Brush: Den. %	Windfall	Visibility
1	934	447	143	—	143	Pac-Vac-Sal-Ech-Ferns	3	24	L	9
2	2509	551	Few	—	—	Pac-Vac-Ferns	2	23	L	11
3	1985	484	19	15	34	Sal-Pac-Vac-Rub	4	28	M	8
4	3523	352	8	16	24	Sal-Pac-Aln	4	28	M	11
6	157	33	15	34	49	Sal	4	33	L	10
All	9108	1867	22	10	32					

An examination of Table 32 shows the following conditions:

1. Type 1 shows the greatest number of Ribes per acre, followed in order by Type 6, Type 3, Type 4, and Type 2.

2. R. viscossissimum is confined to bushy slopes associated with Salix species, Eradication Types 3, 4 and 6.

3. R. lacustre is found in all eradication types.

II AreaNo. 2--Two Mouth Creek Drainage

This area occupies all or part of the following sections:

T. 62 N--R. 3W--Boise Meridian, Idaho
Sections 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, and 34.

T. 62 N--R. 4W--Boise Merdian, Idaho
Sections 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, and 36.

6. Practically no R. viscosissimum was found in timber age classes older than the 20-40 year age class.

7. R. lacustre was found in every timber age class except the 40-60 year age class, chiefly along streams.

Table 32 gives a summary of Ribes conditions by eradication types on this area.

TABLE XXXII
Ribes per Acre by Eradication Types Priest Lake Timber Protective Association, East of Upper Priest River

Erad. Type	Acres	Chains of Recomm. Strips	Ribes per Acre: R. lac.	R. viscos.	Total	Brush: Genera	Ht. Ft.	Den. %	Windfall	
1	934	447	143	—	143	Pac-Vac-Sal-Ech-Ferns	5	24	L	9
2	2509	551	Few	—	—	Pac-Vac-Ferns	2	23	L	11
3	1985	484	19	15	34	Sal-Pac-Vac-Rub	4	28	M	8
4	3523	352	8	16	24	Sal-Pac-Aln	4	28	M	11
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This area occupies all or part of the following sections:

T. 62 N--R. 3W--Boise Meridian, Idaho
Sections 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, and 34.

T. 62 N--R. 4W--Boise Merdian, Idaho
Sections 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, and 36.

Accessibility

This area borders on Lower Priest Lake. An excellent base camp site is located on Huckleberry Bay in the northern part of Section 35. There is a good beach, spring, and dry ground. It is about 16 miles by water from Coolin and is connected with Coolin and Byers' ranch by a horse trail.

Approximately three miles of good horse trail were constructed up Two Mouth Creek in 1924. There are two good camp sites on this trail. It is expected that the trail will be continued for three or four miles further.

At present there is simply a foot path, mostly along logs, up to the headwaters of Two Mouth Creek. Good camp sites are located in Sections 30, 29, 28, and 27.

In the north west quarter of Section 26 is found a trapper's cabin in good condition.

In the north western portion of the area are found several good camp sites along the lake, and along the trail.

Acres Reconnaissanced

Table 33 shows the number of acres reconnaissanced by timber age classes and eradication types.

TABLE XXXIII

Acres of Timber Age Classes in Each Eradication Type.

Two Mouth Creek

Timber Age Class	Eradication Types, Acres 1	2	3	4	5	7	Total	% of Area in each Timber Age Class.
10-20	17	—	65	--	—	—	82	.7
20-40	—	—	—	287	256	—	543	4.9
40-60	--	--	—	164	30	—	194	1.7
60-80	22	—	—	170	—	273	465	4.1
100-200	569	8927	—	—	—	444	9940	88.6
Totals	608	8927	65	621	286	717	11,224	100
% acreage in each Erad. Type	5.4	79.5	.6	5.5	2.6	6.4		100

An examination of Table 33 shows the following facts:

1. This area is principally occupied by mature timber. Practically 80% is in Eradication Type No. 2, Ribes free; and nearly 90% in a mature aged stand.

Accessibility

This area borders on Lower Priest Lake. An excellent base camp site is located on Huckleberry Bay in the northern part of Section 35. There is a good beach, springs, and dry ground. It is about 16 miles by water from Coolin and is connected with Coolin and Byers' ranch by a horse trail.

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60-80	22	—	—	170	—	273	465	4.1
100-200	569	8927	—	—	—	444	9940	88.6
Totals	608	8927	65	621	286	717	11,224	100
% acreage in each Erad. Type	5.4	79.5	.6	5.5	2.6	6.4		100

An examination of Table 33 shows the following facts:

1. This area is principally occupied by mature timber. Practically 80% is in Eradication Type No. 2, Ribes free; and nearly 90% in a mature aged stand.

White Pine and Ribes Factors

Table 34 and 35 show the white pine and Ribes conditions on this area.

The following conditions are evident from an examination of Table 34.

1. The largest amount of mature white pine occurs in the 100 to 200 year age stand, where it makes up over 15% of the mature trees by count.

2. The 10-20 and 20-40 year age classes show a good white pine pole and reproduction stand.

3. There is an understory of poles in the mature stand, as evidenced by the 115 poles per acre.

4. Brush is relatively light on this area. The highest density is found in the 60-80 year age class along streams. The largest number of Ribes per acre, 206 R. lacustre is also found in this situation.

5. R. viscossissimum is found in every age class except the 10-20 year age class. This is probably due to the quite open type of timber growth occuring on the area.

6. R. lacustre is found in every age class.

7. Nearly 80% of the total area, or 8927 acres show an average of one R. lacustre per acre. This would be a relatively inexpensive area from which to eradicate the Ribes.

Table 35 show the Ribes condtions by eradication types.

White Pine and Ribes Factors

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The following conditions are evident from an examination of Table 34.

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6. R. lacustre is found in every age class.

7. Nearly 80% of the total area, or 8927 acres show an average of one R. lacustre per acre. This would be a relatively inexpensive area from which to eradicate the Ribes.

Table 35 show the Ribes conditions by eradication types.

TABLE XXXIV

White Pine and Ribes Conditions by Timber Age Classes and Eradication Types. Two Mouth Creek and Huckleyberry Bay.

Age Class (Years)	Timber Stand Composition	Eradication Type	Acres	Chains of reconnaissance strips	Mature White Pine Ave. DBH in inches	Mature White Pine No	Mature Mixed No	Poles W.P. No.	Poles Mixed No.	Reprod. W.P. No.	Reprod. Mixed No.	Ribes per Acre R. lac.	R. Viscoss	R. acer.	Total Ribes	Brush Genera	Height Ft.	Density %	Windfall	Visibility (Feet)
10-	C-H-WP-WF	1	17	3	---	13	65	--	52	104	546	13	--	--	13	Vac-Aln-Lon	3	20	L	12
20.	WP-WF-DF	3	65	37	---	2	18	44	16	276	1498	25	--	--	25	Vac-Rub-Lon	2	15	L	13
Ave.	WF-WP-C-H-DF	All	82	40	8"	4	27	36	23	246	1312	23	--	--	23	Vac-Rub-Aln-Lon	3	18	L	13
20-	DF-WF-WP-LP-L-C-H	4	287	161	---	2	20	6	10	437	2743	--	9	--	9	Vac-Aln-Pac	3	23	M	5
40.	H-C-WF-WP-S	5	256	53	---	19	47	44	59	219	3130	11	--	--	11	Vac-Rhod-Lon	3	9	M	8
Ave.	H-C-WP-DF-WF-S	All	543	214	10"-14"	10	33	24	33	334	2926	5	5	--	10	Vac-Aln-Rhod-Pac-Lon	3	15	M	6
40-	DF-WF-WP-H-C	4	164	71	---	2	60	3	84	15	37	2	32	--	34	Pac-Acer	4	24	M	11
60.	WF-C-H-LP-WP	5	30	10	---	16	40	--	80	--	4020	--	--	--	--	-----	--	--	M	10
Ave.	DF-WF-C-WP-H-LP	All	194	81	14"-18"	4	52	3	83	13	653	2	27	--	29	Pac-Acer	4	20	M	10
60-	C-H-S-WF-WP	1	22	13	---	3	110	3	60	9	490	206	--	--	206	Aln-Ech	3	31	L	10
80.	WF-S-H-WP	4	170	56	---	2	70	--	19	--	104	34	--	1	35	Vac-Lon-Rhod	1	10	M	15
	WF-S-H-WP-C	7	273	178	---	3	17	5	23	39	779	51	1	--	52	Aln-Vac-Menz	3	15	L	9
Ave.	WF-S-H-WP	All	465	247	18"-24"	3	41	3	23	31	493	54	1	1	56	Aln-Vac-Lon-Ech-Rhod-Menz	2	12	L	10
100-	C-H-WP	1	569	188	---	17	79	9	76	44	674	27	4	1	32	Vac-Pach-Aln-Lon	3	21	L	12
200.	H-C-WP-WF-DF	2	8927	2629	---	21	119	10	110	41	691	1	--	--	1	Vac-Pac-Acer-Lon	2	18	L	27
	WF-C-H-S-WP	7	444	282	---	16	111	4	48	25	289	15	½	--	15½	Vac-Pac-Aln-Rhod	2	13	L	24
Ave.	H-C-WP-WF-DF-S	All	9940	3099	20"-30"	20	110	10	105	40	680	3	--	--	3	-------	2	18	L	26
Total			11224	3681								5	1	Few	6					

TABLE XXXIV

White Pine and Ribes Conditions by Timber Age Classes and Eradication Types. Two Mouth Creek and Huckleberry Bay.

Timber Stand: Age Class (Years)	Timber Stand: Composition	Eradication Type	Acres	Chains of reconnaissance strips	Timber per Acre: Mature White Pine: Ave. DBH in inches	Mature White Pine: No.	Mixed No.	Poles: W.P. No.	Poles: Mixed	Reprod.: W.P. No.	Reprod.: Mixed No.	Ribes per Acre: R. lac.	R. viscos.	R. acer.	Total Ribes	Brush: Genera	Height Ft.	Density %	Windfall	Visibility (Feet)
10-	C-H-WP-WF	1	17	3	—	13	65	---	52	104	546	13	---	---	13	Vac-Aln-Lon	3	20	L	12
20.	WP-WF-DF	3	65	37	--	2	18	44	15	276	1498	25	---	---	25	Vac-Rub-Lon	2	15	L	13
Ave.	WF-WP-C-H-DF	All	82	40	8"	4	27	36	23	246	1312	23	---	---	23	Vac-Rub-Aln-Lon	3	18	L	13
20-	DF-WF-WP-LP-L-C-H	4	287	161	--	2	20	6	10	437	2743	---	9	---	9	Vac-Aln-Pac	3	25	M	5
40.	H-C-WF-WP-S	5	256	53	--	19	47	44	59	219	3170	11	---	---	11	Vac-Rhod-Lon	3	9	M	8
Ave.	H-C-WP-DF-WF-S	All	543	214	10"-14"	10	33	24	33	334	2926	5	5	---	10	Vac-Aln-Rhod-Pac-Lon	3	15	M	6
40-	DF-WF-WP-H-C	4	164	71	—	2	60	3	84	15	37	2	32	---	34	Pac-Acer	4	24	M	11
60.	WF-C-H-LP-WP	5	30	10	—	16	40	---	80	---	4020	---	---	---	---	----	---	---	M	10
Ave.	DF-WF-C-WP-H-LP	All	194	81	14"-18"	4	52	3	63	13	653	2	27	---	29	Pac-Acer	4	20	M	10
60-	C-H-S-WF-WF	1	22	13	---	3	110	3	60	9	490	206	---	---	206	Aln-Rch	3	31	L	10
80.	WF-S-H-WP	4	170	55	---	2	70	---	19	---	104	34	---	1	35	Vac-Lon-Rhod	1	10	M	15
	WF-S-H-WP-C	7	273	178	---	3	17	5	23	39	779	51	1	---	52	Aln-Vac-Mens	3	15	L	9
Ave.	WF-S-H-WP	All	465	247	18"-24"	3	41	3	23	31	493	54	1	1	56	Aln-Vac-Lon-Rch-Rhod-Mens	2	12	L	10
100-	C-H-WP	1	569	188	---	17	79	9	76	44	674	27	4	1	32	Vac-Pach-Aln-Lon	3	21	L	12
200.	H-C-WF-WF-DF	2	8927	2629	---	21	119	10	110	41	691	1	---	---	1	Vac-Pac-Acer-Lon	2	18	L	27
	WF-C-H-S-WP	7	444	282	---	16	111	4	43	25	289	15	½	---	15½	Vac-Pac-Aln-Rhod	2	15	L	24
Ave.	H-C-WF-WF-DF-S	All	9940	3099	20"-30"	20	110	10	105	40	680	3	---	---	3	------	2	13	L	26
Total			11224	3681								5	1	Few	6					

TABLE XXXV
Summary of Ribes Conditions by Eradication Types.
Two Mouth Creek Drainage

Erad. Type	Acres	Chains of Reconn. Strips	Ribes per Acre: R. lac.	R. visc.	R. acer.	Total	Brush: Genera	Ht. Ft.	Den. %	Windfall	Visibility
1	608	204	34	4	1	39	Vac-Pac-Aln-Lon-Ech	3	20	L	12
2	8927	2629	1	----	----	1	Vac-Pac-Acer-Lon	2	18	L	17
3	65	37	25	---	---	25	Vac-Rub-Lon	2	15	L	13
4	621	288	10	13	Few	23	Vac-Pac-Aln-Lon-Rub-Rhod	3	20	M	9
5	286	63	$10\frac{1}{2}$	---	---	$10\frac{1}{2}$	Vac-Rhod-Lon	3	10	M	9
7	717	460	29	1	---	30	Vac-Aln-Pac-Rhod-Menz	2	14	M	18
Total	11224	3681	5	1	Few	6					

Certain facts are evident from an examination of Table 35.

1. Ribes are relatively scarce on the entire area. The largest number of Ribes per acre are found in Type No. 1. In decreasing numbers of Ribes per acre the eradication types occur in the following order: Type 1, 7, 3, 4, 5, 2.

2. R. viscossissimum is found in Types 1, 4, and 7.

3. R. lacustre occurs in every eradication type.

4. Brush density is low in every timber age class.

5. Vaccinium species, huckleberry, is the predominant brush.

III Summary of Conditions on Areas No. 1 and No. 2, Priest Lake Timber Protective Association.

Table 36 shows the number of acres reconnaissanced in these two areas by timber age classes and eradication types.

TABLE XXXV
Summary of Ribes Conditions by Eradication Types.
Two Mouth Creek Drainage

Erad. Type	Acres	Chains of Recomm. Strips	Ribes per Acre: R. lac.	R. visc.	R. acer.	Total	Brush: Genera	Ht. Ft.	Dens. %	Windfall	Visibility
1	608	204	34	4	1	39	Vac-Pac-Aln-Lon-Ech	3	20	L	12
2	5927	2629	1	----	----	1	Vac-Pac-Acer-Lon	2	18	L	17
3	65	37	25	---	---	25	Vac-Rub-Lon	2	15	L	13
4	621	288	10	13	Few	23	Vac-Pac-Aln-Lon-Rhod	3	20	M	9
5	286	63	10½	---	---	10½	Vac-Rhod-Lon	3	10	M	9
7	717	460	29	1	---	30	Vac-Aln-Pac-Rhod-Mens	2	14	M	18
Total	11224	3681	5	1	Few	6					

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III Summary of Conditions on Areas No. 1 and No. 2, Priest Lake Timber Protective Association.

Table 36 shows the number of acres reconnaissanced in these two areas by timber age classes and eradication types.

TABLE XXXVI

Acres of Timber Age Classes in Each Eradication Type. Priest Lake Timber Protective Association Lands in Upper Priest River and Two Mouth Drainage.

Timber Age Class(Years)	Eradication Types--Acres 1	2	3	4	5	6	7	Total	% of Acreage in each Timber Age Class.
0-10	77	--	304	--	--	157	--	538	2.7
10-20	229	--	1459	3098	--	--	--	4786	23.6
20-40	10	--	287	712	256	--	--	1265	6.2
40-60	5	491	--	164	30	--	--	690	3.4
60-80	22	--	--	170	--	--	273	465	2.3
100-200	941	10047	--	--	--	--	444	11432	56.2
200 +	258	898	--	--	--	--	--	1156	5.6
Total	1542	11436	2050	4144	286	157	717	20332	
% of acreage in each Erad. Type	7.6	56.2	10.1	20.4	1.4	.8	3.5		100.0

1. An examination of Table 36 shows that 56.2% of the total acreage in the two areas is mature, Ribes free. This is the cheapest type to eradicate.

2. Eradication Type 1, probably the most expensive to work, occupies 7.6% of the area.

White Pine and Ribes Conditions on the Two Areas.

Tables 37 and 38 show the conditions by timber age classes and eradication types on the two areas.

An examination of Table 37 shows the following facts:

1. Practically 17% by count of the mature trees in the 100-200 year age class are white pine, with an average DBH of about 24 inches.

2. The 0-10, 10-20, 20-40 year age classes show the best pole reproduction stand of white pine.

3. R. viscossimum is the most abundant in the 10-20 year age class. It is very scarce or absent in age classes older than the 40-60 year stand.

4. R. lacustre is present in all timber age classes.

TABLE XXXVI

Acres of Timber Age Classes in Each Eradication Type. Priest Lake Timber Protective Association Lands in Upper Priest River and Two Mouth Drainage.

Timber Age Class(Years)	Eradication Types--Acres 1	2	3	4	5	6	7	Total	% of Acreage in each Timber Age Class.
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1. Practically 17% by count of the mature trees in the 100-200 year age class are white pine, with an average DBH of about 24 inches.
2. The 0-10, 10-20, 20-40 year age classes show the best pole reproduction stand of white pine.
3. R. viscosissimum is the most abundant in the 10-20 year age class. It is very scarce or absent in age classes older than the 40-60 year stand.
4. R. lacustre is present in all timber age classes.

TABLE XXXVII

Summary of Conditions by Timber Age Classes on Priest Lake Timber Protective Association Lands, East of Priest River, and Two Mouth Creek Drainage Combined.

Timber Stand: Age Class (Years)	Timber Stand: Composition	Eradication Type	Acres	Chains of reconnaissance strips	Timber per Acre: Mature White Pine: Ave. DBH and No. 16' Logs Per Tree	Timber per Acre: Mature White Pine: No.	Timber per Acre: Mature: Mixed No.	Timber per Acre: Poles: W.P. No.	Timber per Acre: Poles: Mixed No.	Timber per Acre: Reprod.: W.P. No.	Timber per Acre: Reprod.: Mixed No.	Ribes per Acre: R. lac.	Ribes per Acre: R. visc.	Ribes per Acre: R. acer.	Ribes per Acre: Total Ribes	Brush: Genera	Brush: Ht. Ft.	Brush: Den. %	Windfall	Visibility (Feet)
0-10	WP-C-H-WF-S	All	538	130	---	--	2	20	11	159	569	9	10	--	19	Sal-Pac-Cean	4	30	M	12
10-20	WF-WP-C-H	All	4786	751	8" - 10"	1	4	13	22	259	1284	13	16	--	29	Sal-Pac-Aln	4	28	M	10
20-40	C-H-WP-DF-WF-S	All	1265	347	10" - 12"	6	19	39	59	190	2018	6	10	--	16	Pac-Vac-Sal-Aln-Rhod-Rub-Lon	4	26	M	8
40-60	C-DF-H-WF-WP-LP	All	690	192	12" - 18"	1½	90	3	107	17	2307	½	6½	--	7	Pac-Tax-Acer-Ech	3	17	L	14
60-80	WF-S-H-WP	All	465	247	18" - 24"	3	41	3	23	31	493	54	1	1	56	Aln-Vac-Lon-Ech-Rhod-Menz	2	12	L	10
100-200	H-C-WP-WF-DF-S	All	11432	3635	20" - 28"	19	103	10	100	38½	674	13	--	--	13	Vac-Pac-Aln-Rhod	2	19	L	24
200 +	C-H-WP	All	1156	246	28" - 34"	2	110	2	151	23	679	4	--	--	4	Ferns-Rub-Pac-Tax-Ech	3	25	L	11
Total			20,332	5548								12½	5		17½					

TABLE XXXVII

Summary of Conditions by Timber Age Classes on Priest Lake Timber Protective Association Lands, East of Priest River, and Two Mouth Creek Drainage Combined.

Timber Stand: Age Class (Years)	Timber Stand: Composition	Eradication Type	Acres	Chains of reconnaissance strips	Timber per Acre: Mature: White Pine: Ave. DBH and No. 16' Logs Per Tree	Mature: W.P. No.	Mature: Mixed No.	Poles: W.P. No.	Poles: Mixed No.	Reprod.: W.P. No.	Reprod.: Mixed No.	Ribes per Acre: R. lac.	R. visc.	R. scar.	Total Ribes	Brush: Genera	Ht. Ft.	Den. %	Windfall	Visibility (feet)
0-10	WP-C-H-WF-S	All	538	130	---	---	2	20	11	159	569	9	10	--	19	Sal-Pac-Gean	4	30	M	12
10-20	WF-WP-C-H	All	4786	751	8" - 10"	1	4	13	22	259	1284	13	16	--	29	Sal-Pac-Aln	4	28	M	10
20-40	C-H-WP-DF-WF-S	All	1265	347	10" - 12"	6	19	39	59	190	2018	6	10	--	16	Pac-Vac-Sal-Aln-Rhod-Rub-Lon	4	26	M	8
40-60	C-DF-H-WF-WP-LP	All	690	192	12" - 18"	1½	90	3	107	17	2707	¼	6¾	--	7	Pac-Tax-Acer-Ech	3	17	L	14
60-80	WF-S-H-WP	All	465	247	18" - 24"	3	41	3	23	31	493	54	1	1	56	Aln-Vac-Lon-Ech-Rhod-Menz	2	12	L	10
100-200	H-C-WP-WF-DF-S	All	11432	3635	20" - 28"	19	103	10	100	35½	674	13	--	--	13	Vac-Pac-Aln-Rhod	2	19	L	24
200 +	C-H-WP	All	1156	246	28" - 34"	2	110	2	151	23	679	4	--	--	4	Ferns-Rub-Pac-Tax-Ech	3	25	L	11
Total			20,332	5548								12¼	5		17¼					

TABLE XXXVIII
Summary of Ribes Conditions by Eradication Types, Priest Lake Timber Protective Association, East of Upper Priest River Area, and Two Mouth Creek Area

Erad. Type	Acres	Chains Of Reconn. Strips	Ribes per Acre: R. lac.	Ribes per Acre: R. visc.	Ribes per Acre: R. acer.	Ribes per Acre: Total	Brush: Genera	Brush: Ht. Ft.	Brush: Den. %	Windfall	Visibility
1	1542	651	99½	1½	½	101½	Pac-Vac-Sal-Aln-Ech-Lon	3	22	L	10
2	11436	3180	1	--	--	1	Vac-Pac-Rub-Lon	2	19	L	16
3	2050	521	19	14½	--	33½	Sal-Pac-Vac-Rub-Lon	4	28	M	8
4	4144	640	8	15½	--	23½	Sal-Pac-Vac-Aln-Lon-Rhod	4	27	M	11
5	286	63	10½	--	--	10½	Vac-Rhod-Lon	3	10	M	9
6	157	33	15	34	--	49	Sal	4	33	L	10
7	717	460	29	1	--	30	Vac-Aln-Pac-Rhod-Menz	2	14	M	18
Total	20332	5548	12½	5	--	17½					

An examination of Table 38 shows the following facts:

1. The largest number of Ribes per acre is found in Type 1. In order of decreasing abundance of Ribes the eradication types fall into the following order: Type 1, 6, 3, 7, 4, 5, and 2.

2. R. viscossissimum is found in all eradication types except Type 2 and Type 5.

3. R. lacustre occurs in every eradication type.

4. Salix species appear to be the chief associates of R. viscossissimum.

5. Brush is relatively sparse. There seems to be no definite relationship apparent between density of bush and number of Ribes per acre.

6. Type 2, which is the cheapest type to work, occupies over 56% of the area, with an average of 1 R. lacustre per acre.

IV Analysis of Reconnaissance Time

Table No. 39 shows how time was spent by reconnaissance men.

TABLE XXXVIII

Summary of Ribes Conditions by Eradication Types, Priest Lake Timber Protective Association, East of Upper Priest River Area, and Two Mouth Creek Area

Erad. Type	Acres	Chains of Recon. Strips	Ribes per Acre: R. lac.	R. visc.	R. acer.	Total	Brush: Genera	Ht. Ft.	Den. %	Windfall	Visibility
1	1542	651	99½	1½	⅝	101⅝	Pac-Vac-Sal-Aln-Ech-Lon	3	22	L	10
2	11436	3180	1	—	—	1	Vac-Pac-Rub-Lon	2	19	L	16
3	2050	521	19	14½	—	33½	Sal-Pac-Vac-Rub-Lon	4	28	M	8
4	4144	640	8	15½	—	23½	Sal-Pac-Vac-Aln-Lon-Rhod	4	27	M	11
5	286	63	10½	—	—	10½	Vac-Rhod-Lon	3	10	M	9
6	157	33	15	34	—	49	Sal	4	33	L	10
7	717	460	29	1	—	30	Vac-Aln-Pac-Rhod-Mon	2	14	M	18
Total	20332	5548	12½	5	—	17½					

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4. Salix species appear to be the chief associates of R. viscosissimum.

5. Brush is relatively sparse. There seems to be no definite relationship apparent between density of bush and number of Ribes per acre.

6. Type 2, which is the cheapest type to work, occupies over 55% of the area, with an average of 1 R. lacustre per acre.

IV Analysis of Reconnaissance Time

Table No. 39 shows how time was spent by reconnaissance men.

TABLE XXXIX

Analysis of Reconnaissance Time Spent on Area No. 1 and 2, Priest Lake Timber Protective Association, June 16, 1924 to September 26, 1924.

Type of Work	Man	Days	Percentages	
Reconnaissance Strips	225		43.0	
Traverse	32½		6.2	
Mapping	23		4.4	
Training	75½		14.4	
Total Actual Work		356		68.0
Travel, Camp Making, Packing	79	79	15.1	15.1
Rain, no work	32		6.1	
Sundays, Holidays	56½		10.8	
Total, No Work		88½		16.9
Grand Total	523½	523½	100.	100.

Of the total 523½ man days spent on reconnaissance on the Priest Lake Timber Protective Association, 193 man days were furnished by the Association, and 330½ man days by the Office of Blister Rust Control.

In addition to the 523½ days and not included in it, is an item of 48½ days spent in fighting fires, paid for by the Forest Sevice, except 2½ days of Supervisor's time paid for by the Office of Blister Rust Control. 8½% of the total time was devoted to fighting seven fires.

From Table 39 certain observations may be made.

1. A relatively high percent of time, 14.4%, was spent in training the men. This was due to the fact that this work was entirely new to all of the reconnaissance men. In order to obtain the right perspective, it was necessary for them to work in eradication crews for several days, in addition to the regular reconnaissance training. At the end of the training period, the men consecutively ran the same reconnaissance strip. The results were compared and talked over, with the purpose of establishing the same standards of judgement in taking data. On the first of August, the idea of eradication types was evolved. The reconnaissance men worked in the eradication crews for a few days on the different eradication types in order to become familiar with such types. In future work it is probably certain that it will not be necessary to devote so much time to training men, since there will be more trained men available.

2. 68% of the total reconnaissance time showed actual results. The time spent in training is included because much of the data then taken were used.

3. Over 15% of the time was spent in travel, making camps, back packing supplies, etc. Camps had to be moved quite often in order to cut down time spent in walking to and from work. The men established 10 camps during the season. Camp making consisted in providing for camp

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Traverse	:	32½		:	6.2	
Mapping	:	23		:	4.4	
Training	:	75½		:	14.4	
Total Actual Work	:		356	:		68.0
Travel, Camp Making, Packing	:	79	79	:	15.1	15.1
Rain, no work	:	32		:	6.1	
Sundays, Holidays	:	56½		:	10.8	
Total, No Work	:		88½	:		16.9
Grand Total	:	523½	523½	:	100.	100.

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sanitation, as approved by the Forest Service, in the construction of suitable latrines, and burying all tin cans and camp refuse. Considerable time was spent in bringingin supplies by back packing to camps not reached by horse trails.

V Costs of Reconnaissance

Table No. 40 gives the salary subsistence and transportation costs of the men working on Areas No. 1 and No. 2 discussed in this paper. No costs are given here of the two men doing educational and reconnaissance work on other portions of the Priest Lake Timber Protective Association. Such costs are given on page 159 "Results of Summer's Work on Priest Lake Timber Protective Association."

TABLE XL

Costs of Reconnaissance Men Working on Areas No. 1 and No. 2, Priest Lake Timber Protective Association

Paid by Whom	No. Men	Position	Monthly Salary	No. of days	Total Salary	Subsistence	Transportation	Total Expense
Priest	1	Helper	$70.	54	126.00	$ 49.43	---	$175.43
Lake	1	"	70.	89	207.67	70.51	---	278.18
Timber	1	"	70.	75	175.00	63.58	---	238.58
Protective	1	"	70.	5	11.67	8.61	---	20.28
Ass'n.	1	"	70.	5	11.67	8.61	---	20.28
Total	5			228	532.01	200.74		732.75
U. S.	a.1	Supervisor	225.	50	370.00	48.82	8.85	427.67
Office of	1	Recorder	125.	89	370.83	87.21	9.80	467.84
Blister	1	"	110.	16	58.67	15.66	1.00	75.33
Rust	1	"	80.	88	234.67	89.30	9.80	333.77
Control	1	"	80.	90	240.00	96.11	5.90	342.01
Total	5			b.333	1274.17	337.10	35.35	1646.62
Grand Total	10			561	1806.18	537.84	35.35	2379.37

a.--Represents half of Supervisors time. Remainder charged to reconnaissance on federal lands.

b.--Total includes $2\frac{1}{2}$ days of Supervisor's time spent in fighting fires and paid for by the Office of Blister Rust Control.

Subsistence costs are based on the following costs per man day:
Cost per day, cook furnished--$1.23
Cost per day, without cooking charge--.97

The subsistence cost includes the actual cost of the food, and the transportation charges for delivering it to the camps on horse trails.

Transportation costs of men are those necessary to get the men to and from Spokane.

Table 41 shows the total costs.

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TABLE XLI
Total Costs of Reconnaissance on Areas No. 1 and No. 2, Priest Lake Timber Protective Association.

Items	Costs		
	By Association	By Office of B.R.C.	Total
Salaries	532.01	1274.17	1806.18
Subsistence	200.74	337.10	537.84
Transportation		35.35	35.35
20% of Property		27.56	27.56
Total	732.75	1674.18	2406.93

Property consisted of non-expendable supplies, such as scientific instruments, bedding, tent, etc., used by reconnaissance men working on these two areas in the Association. 20% of the total value was charged against the work done this year.

$$\text{Cost per acre} = \frac{2406.93}{20332 \text{ Acres}} = .118 \text{ per acre}$$

E(2.3) Chemical Eradication of Ribes

Introduction

This report covers the experimental work on the eradication of Grossulariaceae in the white pine forests of Idaho during the season of 1924.

This particular problem is one phase of the general experimental program on eradication of Grossulariaceae (hereafter referred to as Ribes). The general purpose of such work is to secure the control of white pine blister rust, by removal of its Ribes hosts, and hence to protect the white pine timber on the ground.

It is recognized that the general method of Ribes removal will be by hand pulling. It has been found, however, that in certain areaswithin the white pine type, Ribes occur in such profusion as to render hand pulling impracticable, when the cost of such work is balanced against the value of the white pine endangered by the presence of these Ribes. Also, other local growth, moisture, or topographical conditions may similarly increase the cost of hand pulling, irrespective of the actual number of plants. Experimental chemical eradication has been carried on to determine if the Ribes on such areas can be eradicated by the application of chemicals at a cost less than that of hand pulling.

In considering possible chemicals the following general properties have been recognized as necessary to the ultimate success of such work.

1. The chemical should be so cheap that the combined cost of the chemical and its application to Ribes will be less than any other means of eradication.

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Total Costs of Reconnaissance on Areas No. 1 and No. 2, Priest Lake Timber Protective Association.

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Salaries	532.01	1274.17	1806.18
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In considering possible chemicals the following general properties have been recognized as necessary to the ultimate success of such work.

1. The chemical should be so cheap that the combined cost of the chemical and its application to Ribes will be less than any other means of eradication.

2. It must be available in large enough quantites to be used in extensive eradication in the white pine forests which are to be protected from the blister, rust.

3. It should be capable of transportation into the forests. Very often transportation facilities are very meager and supplies must be carried long distances by pack horse or on back. Under such conditions heavy or dangerous substances would not be transportable.

4. It should be comparatively non-toxic to animals. A toxic substance may be applied to the surface of the soil or injected into the soil at the roots of the plant without much danger to livestock or protected animals. If such a substance were to be applied as a spray to the leaf surface, all animals would be endangered and if running water were present the pollution of streams would result.

5. It should be capable of being easily applied to Ribes. Toxic substances or substances which require skill and training to apply would increase the cost of eradication in that ordinary labor could not be employed.

6. It should cause the death of Ribes with a single application. There are many substances which will cause defoliation of the plants but unless repeated applications are made the plant will regain its foliage or will sprout up with new stems from the crown.

PREVIOUS WORK DONE WITH CHEMICALS

The chemicals used in the experimental work this summer were suggested from various sources. Some were chosen because of personal observations or a knowledge of their chemical properties. All available literature which might suggest possible poisons was carefully read over and all practical suggestions were tried.

Much help was obtained from the work on weed eradication and wheat rust control.

W. G. Wahlenberg of the Savenac Nursery tried copper sulfate, zinc chloride and zinc sulfate for killing weeds in nursery stock. Zinc chloride was finally adapted for this use and has been giving very good results.

W. S. Regan assisted by others of the U.S.D.A. has tried a large number of chemicals on Ribes but does not seem to have decided on anything which is perfectly desirable for the purpose of eradication. He tried the following substances: steam, phenol, iron sulfate, copper sulfate, sodium nitrate, copper nitrate, mercuric chloride, formalin, carbon bisulfide, sodium arsenite, sodium chloride, sulfuric, hydrochloric and nitric acids, ammonia, fuel and dip oils and calcium and hydrogen cyanide. From these investigations Regan recommended sodium arsenite and fuel oils to give the best results but they do not seem to have been used extensively in practice.

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W. S. Regan also made an investigation on the use of chemicals for destroying barberry plants. The chemicals used were: Dipoil (25% cresol), fuel oil and sodium arsenite. The chemicals were applied to the foliage, foliage and base, base with tops on and to the cut-off stumps. The applications to the plants with tops cut off gave the best results but the applications to the base of the plant with tops on was considered the most efficient. The fuel oil was found to be the most economical and efficient. In the case of barberry plants Regan concludes that the chemical method offers a saving in time, labor, and expense over the hand digging method.

Very little work has been done in this line of investigation and not much material is available in literature on the subject of toxic agents. The following is a brief summary of articles which have appeared in various journals:

In "Inorganic Plant Poisons", W. E. Brenchley, discusses the effect of calcium, magnesium, manganese and copper compounds on herbaceous plants.

Sodium selenide and other compounds of selenium have been found to be very toxic to plants (Bot. Abs. 13-458).

Some substances which were toxic to plants in light produced no effect in the dark. Solutions of cyanides which produce permanent injury in light did not produce injury when plant was kept in the dark. (J Phsy. Ch. 5-108).

The nitrated phenols were found to be more toxic to plants than ordinary phenol and para-nitro phenol is more toxic than either ortho or meta-nitro phenol. Isomeric compounds have different effects on plant tissues (J. Phys. Ch. 7-1105).

Hydroquinone was found to be very toxic to herbaceous plants (Pharm. J. 91-571).

Sulfur dioxide fumes are toxic to plant life. The toxicity is explained by assuming the liberation of humic acid from its salts with the consequent dearrangement in nutrition (Chem. and Met. 7-285).

Hydrogen cyanide is very toxic to plants. 1 part in 100000 kills peas. The HCN is unstable and hydrolyses to ammonium formate in the presence of moisture. Formic acid is toxic only in concentrated solution. 1/100 Molar phenol, cresol, pyrocatechol and pyrogallol is fatal to peas grown in nutrient solution. Dilute solutions, 1/500 Molar, of phenol, phyloroglucin, orcinol, and resorcinol only check the growth of peas. (Ann of Bot. 31-456).

W. S. Regan also made an investigation on the use of chemicals for destroying barberry plants. The chemicals used were: Dipoil (25% cresol), fuel oil and sodium arsenite. The chemicals were applied to the foliage, foliage and base, base with tops on and to the cut-off stumps. The applications to the plants with tops cut off gave the best results but the applications to the base of the plant with tops on was considered the most efficient. The fuel oil was found to be the most economical and efficient. In the case of barberry plants Regan concludes that the chemical method offers a saving in time, labor, and expense over the hand digging method.

Very little work has been done in this line of investigation and not much material is available in literature on the subject of toxic agents. The following is a brief summary of articles which have appeared in various journals:

In "Inorganic Plant Poisons", W. E. Brenchley, discusses the effect of calcium, magnesium, manganese and copper compounds on herbaceous plants.

Sodium selenide and other compounds of selenium have been found to be very toxic to plants (Bot. Abs. 13-458).

Some substances which were toxic to plants in light produced no effect in the dark. Solutions of cyanides which produce permanent injury in light did not produce injury when plant was kept in the dark. (J Phsy. Ch. 5-108).

The nitrated phenols were found to be more toxic to plants than ordinary phenol and para-nitro phenol is more toxic than either ortho or meta-nitro phenol. Isomeric compounds have different effects on plant tissues (J. Phys. Ch. 7-1105).

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Investigations have been made of possible injurious effects on plants of KCN in discharge slimes from mines. Water in river at the mine contained .05% of KCN. Two kilometers down stream it was .04% and at 4 kilometers it was diluted .025% (Ch. & Met. Eng. 9-588).

Poison absorbed through the roots of plants involves the use of large amounts of the poison as it must produce a toxic condition in the soil and also stop the functioning of the plant. The amount of poison may also be increased by changes brought about by the soil which may render the poison inert. The toxic condition may be transitory or permanent depending on the volatility and solubility of the poison and its affinity for the soil elements and the quality of the soil and drainage conditions. Poisons absorbed through leaves of plants requires a minimum amount of poison and does not involve poisoning of the soil and is more efficient than the root absorbtion method. Poisons suggested for eradication are arsenic compounds, copper sulfate, iron sulfate, sulfuric acid, sodium chloride, carbon bisulfide, petroleum and coal tar oils. (Herbicides in the eradication of weeds, Calif. D.A.Bul. Feb. 1922).

CHEMICALS USED

A review of the literature given in the introduction suggested a large number of substances which might have been tried in this experimental work. It was necessary however, to discard most of them because of the price which made them prohibitive to use on a large scale. The following chemicals appeared to have possibilities for chemical eradication:

Chemical	Formula	Price per lb.
1. Potassium permanganate	$KMnO_4$	$.75
2. Oxalic acid	$(COOH)_2$	.25
3. Manganese sulfate	$MnSO_4$	.80
4. Magnesium sulfate	$MgSO_4$	.26
5. Zinc sulfate	$ZnSO_4$	.37
6. Iron sulfate	$Fe_2(SO_4)_3$	.20
7. Sodium acid sulfate	$NaHSO_4$	.03
8. Calcium chloride	$CaCl_2$	.20
9. Calcium hypochloride	$Ca(OCL)_2$	.15
10. Calcium oxide	CaO	.02

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11. Calcium cyanide	$Ca(CN)_2$	.30
12. Carbon bisulfide	CS_2	.60
13. Copper sulfate	$CuSO_4$	.09
14. Copper carbonate	$CuCO_3$	.35
15. Mercuric chloride	$HgCl_2$	.90
16. Lead acetate	$Pb(C_2H_3O_2)_2$	.85
17. Potassium bromate	$KBrO_3$	.75
18. Potassium ferrocyanide	$K_4Fe\ (CN)_6$	.95
19. Potassium cyanide	KCN	.75
20. Chromic Acid	H_2CrO_4	.80
21. Tannic acid	$C_{14}H_{10}O_9$	1.25
22. Phenol	C_6H_5OH	.35
23. Paris green	$(Cu_3(AsO_4)_2$ $(Cu(C_2H_3O_2)_2$	.80
24. Creosote	Crude	.75
25. "Carco"	Commercial	.90

Sodium nitrate is a well known plant food unless used in excessively large quantities which make it impractical to use in this work. Copper nitrate was replaced by copper sulfate because the sulfate radical is more toxic than the nitrate. Sodium chloride, sodium arsenite and sulfuric, nitric and hydrochloric acids and ammonia, fuel oil, dipoil, and hydrogen cyanide were sufficiently investigated by Regan to show their impractibility.

Potassium permanganate, potassium bromate, and oxalic acid were used because it was thought that strong oxidizing agents would have a strong action on the plant tissues but this was not shown to be the case in the experiments. Manganese and magnesium sulfates were suggested by Dr. St. John of Pullman but were found to be without effect. Mercuric chloride, lead acetate, tannic acid and chromic acid were used because of their power to combine with proteins to render them inert. This was augmented by experiments

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Paris green was used because it had been observed to burn the leaves of potato plants when applied for potato bugs. It was found to be without effect as would probably be expected from the small amount of soluble arsenic contained.

Calcium hypochloride (Bleaching powder) was used for its available chlorine. It was found particularly distructive to the foliage although it is not certain that the plants were killed. Creosote was known to burn leaves and it was found to have very little effect other than burning of the foliage.

TYPES OF CONDITIONS OF RIBES GROWTH

The situations in which the Ribes grow may be used as a basis for their classification. Dividing the eradication problem into different types on this basis the classification may be considered somewhat as follows:

1. R. petiolare or R. lacustre growing directly in water or over it on decaying logs to make a dense patch which effectually hides a stream from view. The roots often grow directly in running water thus making spraying the only possible method of attack.

2. R. petiolare or R. lacustre in dense patches with no individual crowns but away from the stream in slightly moist places.

3. R. lacustre and G. inermis scattered through dense brush which may consist of Alnus, Crataegus, Cornus, Lonicera, Rhamnus and others.

4. R. lacustre in talus or rocky outcrops.

5. R. lacustre in windfalls and slashings.

6. R. viscossissimum in large separate plants near stumps and windfalls.

7. Ribes scattered throughout a district as individual plants.

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spraying the entire leaf surface and stems. In the experiments during the summer this method was found to be the best for all conditions as it was simple, efficient and gave the best results.

2. Applications at the surface of the soil around the crown of the plant. This was done by squirting the liquid at the base of the plant and was only applicable to plants in a fairly dry location. Good results were obtained but it was not as efficient as spraying.

3. Injection in holes at crown of the plant were made by thrusting a sharp pointed rod into the soil next to the crown of the plant and squirting the liquid directly in the hole produced upon withdrawal of the rod. This was the least efficient of the methods tried due to the fact that Ribes have a fairly shallow root system and in a sandy soil most of the solution would be lost in the subsoil.

These three methods were the only ones tried in this work. There are other methods which might be used but they were not tried because of lack of time. The bushes may be cut near the surface of the ground and the substance applied over the stumps. W. S. Regan found this to be a very effective method. In the case of dense patches of Ribes the substance may be broadcasted over the entire surface of the soil.

APPARATUS

The most practical method of carrying and disseminating the chemical when in solution or liquid form was found to be the Hudson Perfection Spray Outfit which sells at most feed stores for $6.50. This is an ordinary five gallon cylindrical tank equipped with a pump and a strap to put over the shoulder for carrying. The tank may be filled about ¾ full and pumped up by a few strokes of the pump which will give sufficient pressure to eject all the liquid. The nozzle will give a fine spray which effectually covers the foliage or if a course stream is desired the nozzle is easily adapted by removing a small plate under the screw cap. All solutions were made up in definite concentrations by weighing out the chemical on a good spring balance and adding the required amount of water measured in a graduated cylinder.

LOCATION OF PLOTS

During the past summer numerous plots have been established in the field. Of the total number of plots 44 are located on Placer Creek six miles south of Wallace, Idaho. There are 10 plots on Lake Creek, four miles west of Wallace and 26 plots on the East River branch of Priest River in Northern Idaho about two miles from the Priest River Forest Experiment Station.

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ESTABLISHMENT OF PLOTS

The Ribes bushes on all plots established were tagged and numbered and the plot was staked in the center with a good cedar stake bearing the number of the plot.

DATA TAKEN ON PLOT

The data taken on each plot included: date of application, character of day, chemical used, method of application, quantity and concentration of solution, number Ribes, shrubs and trees present, character of site and the size, age, number of branches, and amount of leaf bearing stems and the vigor of the plant. (See sample data sheet.)

PLOTS ON PLACER CREEK

All plots on Placer Creek are located in respect to the spot where camp was made. The first camp was situated at the head of the road about two miles above the ranger station in a slight depression. The place is clear of logs and there is a path to the creek which is about 50 feet away. The second camp was located in a clump of large cedar trees about 300 yards below the ranger station and 50 feet from the road.

Ribes were found to be very abundant in the 1910 burn around Wallace. On placer Creek the reproduction is slowly coming in. The trees are between 5 and 10 years old and consists mostly of white pine, Douglas fir, spruce, larch, cedar and some white fir, hemlock, western yellow pine, and lodgepole pine. Throughout the district stumps and down timber are very numerous because of the 1910 burn. R. petiolare occurs mostly as dense patches in the stream bed or in very moist places along the stream. R. lacustre is found all along the stream in moist places and among the numerous windfalls and stumps all over the country even on the highest hills at an elevation of 5500 feet. R. viscossissimum is found generally scattered over the dryer hillsides from the valley bottoms up to about 4000 feet. In this locality plots of R.petiolare, R.lacustre and R. viscosissimum were treated with chemicals during the first part of August.

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Chemical Eradication Data Plot No. _____ Location ________________

Date of Application	Time of Day	Character of Day	Chemical Used	Method of Application	Quantity of Solution	No. of Each Species of Ribes	No.of Each Species of Shrubs & Trees	PH Value of Soil	Site

INITIAL CONDITION OF RIBES

Bush No. & Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Size															
Height															
Age															
Branches															
Leaf Stems															
Dead Stems															
Vigor of Plant															

O B S E R V A T I O N S Date ____________

Bush No.	Vigor	Loss of Leaves	Dead Stems	Vigor of Crown	Distance of Killing	Notes
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

PLOTS ON LAKE CREEK

The plots on Lake Creek are located with respect to the number of telephone poles distant from the Callahan Interstate mine which is just upstream from the plots. The region in the immddiate vicinity of these plots was not burned over in 1910 but has been logged off about 15 years ago so that there is very little mature timber around. The reproduction is of the same type as on Placer Creek except that it is a little older. In this locality applications were only made on R. petiolare and R. lacustre. The shrubs in these two regions are very similar and consist largely of Salix, Alnus, Carnus, Acer, Amelanchier, Crataegus, Symphoricarpos, Rubus, Sambucus, Ceanothus, Lonicera and Pachystima.

PLOTS ON EAST RIVER

These plots are located along a private road on the East Fork of the East River about $\frac{3}{4}$ mile East of the bridge on the main road to Priest Lake. The private road crosses the East Fork on a log bridge and the plots are located with respect to a small clearing to the left of the road and about 200 yards up from the bridge.

The timber on the East River is a mature growth consisting largely of Douglas fir, spruce, white pine, cedar, larch, and hemlock. The shrubs are nearly the same as those around Wallace except for a preponderance of Crataegus. In this region G. inermis occurs as single plants growing in the dense brush usually in a large Crataegus clump. This gooseberry is the only one which was treated with chemicals in this region. Whenever possible the chemicals were kept off the surrounding vegetation but in the case of G. inermis it was necessary to spray the entire clump in which the bush was found.

OPTIMUM SOIL REACTION FOR RIBES

The hydrogen ion concentration of the soil in which Ribes flourish was studied by means of a Lamotte portable soil indicator set. In most cases the soil reaction was found to be very nearly neutral except in the case of rich humus soils without very good drainage. In such cases the soil was usually very slightly acid. The result of a series of determinations to determine the optimum hydrogen ion concentration indicated the value to be very nearly 1 X 10-65, or a specific acidity of 3. A considerable change in the soil reaction does not seem to alter the vitality of Ribes as was indicated by the fact that when quite a large quantity of calcium hydroxide was applied to the soil there was no change in the vigor of the plant even after two months had elapsed although the soil reaction was changed from 1 X 10-6 to 1 X 10-9.

INVESTIGATION OF DAMAGE TO VEGETATION BY SMELTER REFUSE

It was observed that the vegetation along the streams and stream banks around Wallace, Idaho had been completely killed. The mines in the vicinity discharge all their refuse into the streams and it was thought that a knowledge of the cause of death of the vegetation might be of practical importance. The water in the streams is heavily laden with sediment and is a gray chalky color. In a discussion with the chemist at the Hercules Mine it was learned that very little poisonous material was discharged from the mines. It seemed evident that the cause of death was due not so much to poisonous compounds but rather to the fact that very finely divided ore of almost colloidal size was deposited around the roots and compacted to such an extent that the oxygen, which is so necessary for growth, was excluded with the eventual death of the plant. The sediment in the streams contains iron, lead, copper, and zinc in the form of carbonates, sulfides, sulfates, nitrates and oxides. There is also some creosote and flotation oils and free sulfuric acid.

SUMMARY OF RESULTS

No final conclusions can be made in regard to the effect of the chemicals on the Ribes until next spring after dormancy, due to the fact that although the plants may have been defoliated they may renew their activities in the spring. From the observations so far made the following chemicals have shown at least considerable defoliating properties: Calcium chloride, Phenol, calcium hypochloride, mercuric chloride, copper sulfate, potassium bromate, chromic acid, creosote, calcium cyanide, potassium cyanide and potassium ferrocyanide. The results seem to indicate that these substances should be further investigated in future work. Of these chemicals, chromic acid, mercuric chloride, calcium hypochloride and phenol produced more complete defoliation and a higher percentage of killing than the others. These last four were particularly effective when applied as sprays. The soil application were at no time as effective as sprays. This is very desirable as in actual field work a spray is often the only possible method of application. Of the four species of Ribes to which applications were made there was no single species which was particularly resistant to the chemicals. There was also no noticeable difference in the results obtained by a single chemical in different localities. In the case of calcium chloride, phenol, mercuric chloride and calcium cyanide the results are practically the same as those obtained by W. S. Regan in his work in New England. W. G. Wahlenberg has remarkable good results with zinc sulfate on weed seeds and very succulent growths but on more fibrous tissues the chemical is found to be very weak.

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F(2.4) ECOLOGY

The purpose of this study is to secure information which would be of direct and practical value in protecting white pine from blister rust.

It has been commonly observed that Ribes are generally less numerous in mature stands of timber than in young stands. In view of this observation the ecological study was undertaken to determine the following facts:

1. The reason for the above phenomenon.

2. Is there a definite decrease in the number of Ribes after a definite point in the life history of a timber stand?

3. If so what is that point?

4. If the Ribes were removed at or after that point would they reinvade the forest?

In the summer of 1924 this work was directed toward the determination of the time at which suppression of Ribes in coniferous reproduction would occur with the increase of shade and presumably from that as a cause. Studies made were in "burns" of varying ages. It was thought that by comparison of conditions found in comparable areas of differing ages an approximation could be made of the age class in which local control measures would be unnecessary.

Obvious difficulties in securing needed information led to the adoption of a plan of "sampling" by laying off zigzag strips one half rod in width and twenty-four chains in length in selected burns. Strips were laid off with compass, with angles of 90° alternately to left and right at the ends of the third, ninth, fifteenth and twenty-first chains. The object of this type of strip was to eliminate in so far as possible unconscious choice of any particular type of vegetation, making the strip as nearly "at random" as could well be done.

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4. If the Ribes were removed at or after that point would they reinvade the forest?

In the summer of 1924 this work was directed toward the determination of the time at which suppression of Ribes in coniferous reproduction would occur with the increase of shade and presumably from that as a cause. Studies made were in "burns" of varying ages. It was thought that by comparison of conditions found in comparable areas of differing ages an approximation could be made of the age class in which local control measures would be unnecessary.

Obvious difficulties in securing needed information led to the adoption of a plan of "sampling" by laying off zigzag strips one half rod in width and twenty-four chains in length in selected burns. Strips were laid off with compass, with angles of 90° alternately to left and right at the ends of the third, sixth, fifteenth and twenty-first chains. The object of this type of strip was to eliminate in so far as possible unconscious choice of any particular type of vegetation, making the strip as nearly "at random" as could well be done.

ECOLOGY REPRODUCTION STUDY IN BURNED OVER FORESTS U.S.D.A.
BLISTER RUST CONTROL

(Area ____________ Recorder ____________
(Location ____________ Helpers ____________
(Date ____________ ____________

History of Burn.

Transect Number	% of Ground Shaded	Timber	Coniferous Reproduction									Deciduous Trees						Deciduous Brush								Herbage
		Average Ht.	Average Ht.	White Pine	Larch	Fir	Cedar	Douglas Fir	Spruce	Hemlock	Yew	Average Ht.	Alnus	Salix	Betula	Populus	Acer	Average Ht.	Vaccinium	Rubus	Rosa	Ceanothus	Echinopanax	Lonicera	Pachistima	Average Ht.

Complete "census" of all plants within the "transects" so limited was taken in the following manner:

With a working party of two or three a steel tape one chain in length was extended in a straight line in a direction determined by use of a Forest Service Compass. Conspicuous temporary marks were placed along the tape to mark each rod. Plants were then counted for each plot of 1 x $\frac{1}{2}$ rod and the names and numbers of the different species occurring recorded on a tally sheet. Separate records were thus kept for each rod of length. Space was provided on the tally sheets for records of otherpertinent facts relating to slope, soil, light and moisture for each rod. It was felt that by such records subdivided into rods it would be possible to focus upon any peculiarity of plant group closely enough for any purpose of study that might arise.

The accompanying form was used for recording data of the Plant Census.

Ten of the zigzag strips were begun. One of these was not completed as it was found that it would not pass through coniferous reproduction. A detailed map was made of an area one chain square in a five year old burn, on which was shown the location of all Ribes and conifers. This was marked with sufficient permanency that future studies covering the exact area may be made. The detail of this plot study is such that it will be possible to check individual pine and Ribes plants from year to year and to check the coniferous population on all subareas of one fourth of a square rod.

A transect comparable with the zigzag strips was made of the Hughes Fork Trail from the beginning of the steep portion near the Priest River crossing to the North line of Section 22 T. 64 N. R. 5W., a distance of nineteen hundred and ninety-two (1992) feet. Parallel to this, in the dense forest at a distance of twenty feet, a check strip was run and the census taken on it. The study of this trail and the parallel was for the purpose of getting data concerning the entry of plants in such openings in the forest.

Before leaving a strip it was permanently marked at the point of beginning with conspicous cedar posts. Accuracy of notes are relied on to make possible a repetition of the work on any strip should such be desireable.

The map accompanying this general report will give the approximate location of the above mentioned areas.

Complete "census" of all plants within the "transects" so limited was taken in the following manner:

With a working party of two or three a steel tape one chain in length was extended in a straight line in a direction determined by use of a Forest Service Compass. Conspicuous temporary marks were placed along the tape to mark each rod. Plants were then counted for each plot of 1 x ½ rod and the names and numbers of the different species occurring recorded on a tally sheet. Separate records were thus kept for each rod of length. Space was provided on the tally sheets for records of other pertinent facts relating to slope, soil, light and moisture for each rod. It was felt that by such records subdivided into rods it would be possible to focus upon any peculiarity of plant group closely enough for any purpose of study that might arise.

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Ten of the zigzag strips were begun. One of these was not completed as it was found that it would not pass through coniferous reproduction. A detailed map was made of an area one chain square in a five year old burn, on which was shown the location of all Ribes and conifers. This was marked with sufficient permanency that future studies covering the exact area may be made. The detail of this plot study is such that it will be possible to check individual pine and Ribes plants from year to year and to check the coniferous population on all subareas of one fourth of a square rod.

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TABLE XLII

Approximate Age of Burn	Area	Type	Slope	Soil	R. per acre R. lac.	R. per acre R. visc.	Ft. of live stem per acre	Feet of dead stem per acre	Branches of live stem per acre	Number of leaves per acre	Leaves per ft. of l. s.
5-6	L	Brush	West	Residual from granitic.	60	--	356	40	1287	5392	15
				Mixed stony and fine.	--	6	18	4½	23	99	(5.5)
5-6	G	Reburn in 10-year burn. Almost bare.	West	Fine. Residual from granitic	20	--	749	43	2812	12807	(17)
					--	0	0	0	0	0	
7-8	K	Open overstory Larch and White Pine	Gentle North.	Residual from granitic and glacial	271	--	2132	350	5623	23159	11
					--	0	0	0	0	0	
12-15	F	Low brush. Young coniferous reproduction getting established	North West steep.	Moist. Residual from granitic	69	--	990	132	624	4670	5
					--	7	26	3	36	201	8
21-24	C	White fir dominant with White Pine, Cedar and Larch less abundant.	South Steep	Glacial and Rocks	106	--	815	386	5491	14817	18
					--	181	2663	6899	4422	12111	4.5
22-23	E	Open coniferous reproduction	West	Sandy-dry	36	--	284	50	545	3036	11
					--	0	0	0	0	0	
25-30	A	Coniferous reproduction W.P. L.F.C.	South West Terraces	Glacial gravels	--	--	---- Compilation of data incomplete ----				
40-50	P	Coniferous poles	East	Residual from argillaceous shales, Glacial to slight extent	7	--	35	17	50	165	5
					--	0	0	0	0	0	
40-51	H	" "	East	" "	23	--	596	9	40	538	1
					--	0	0	0	0	0	
150 +	M	Mature W. Pine	N. West	?--Residual granitic --?	11	--	0	0	0	0	
6					--	0	0	0	0	0	

TABLE VIII

Approximate Age of Burn	Area	Type	Slope	Soil	B. Lac.	R. visc.	B. per acre: Ft. of live stem per acre	Feet of dead stem per acre	Branches of live stem per acre	Number of Leaves per acre
5-6	L	Brush	West	Residual from granitic.	60	--	356	40	1287	5392
				Mixed stony and fine.	--	6	18	14	23	99
5-6	G	Reburn in 10-year burn. Almost bare.	West	Fine. Residual from granitic	20	--	749	43	2812	12807
					--	0	0	0	0	0
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					--	0	0	0	0	0
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					--	7	26	3	36	201
21-24	C	White fir dom-inant with White Pine, Cedar and Larch less abundant.	South Steep	Glacial and Rocks	106	--	815	335	5491	24817
					--	151	2663	6899	4422	12111
22-23	E	Open coniferous reproduction	West	Sandy-dry	36	--	234	50	545	3036
					--	0	0	0	0	0
25-30	A	Coniferous re-production W.P., L.P.G.	South West	Glacial gravels: Terraces	--	--	---- Compilation of data incomplete ----			
40-50	P	Coniferous poles	East	Residual from argillaceous shales, Glacial to slight extent	7	--	35	17	50	165
					--	0	0	0	0	0
40-51	H	" "	East	" "	23	--	596	9	40	538
					--	0	0	0	0	0
150 +	M	Mature W. Pine	N. West	?--Residual granitic --?	11	--	0	0	0	0
					--	0	0	0	0	0

As yet little of the data collected from these studies have been utilized in summaries. It seems probable that much may not be of a character to throw light on problems for which solution is sought. On the other hand such as has been utilized seems to indicate that other ecological factors which have not yet been included should be considered. An increased number of similar areas must be studied before conclusions other than the most tentative in character may be drawn.

Indicated by the materials considered are the following:

I.--Concerning Ribes lacustre the following hints are derived:

A. R. lacustre enters a burn early, within the first two years, reaches the maximum number of plants between the eighth and tenth years, the maximum leafage about the 10th year to 15th year and the maximum feet of live stem in about the 10th year. The maximum of dead stem appears to coincide with the maximum of live stem. More extensive investigations may change this.

B. Notable diminution of the number of plants of R. lacustre begins very shortly after the maximum number is reached, and decreases to a minmum about the fortieth year.

C. In plotting data collected a considerable "spread" or "dispersion" is indicated in the numbers of R. lacustre within the same age classes on different areas. This was doubtless due to lack of real similarity of situations. Ecological factors not yet recognized are perhaps the cause. This "spread" is not unexpected but should be reduced as new factors are recognized as occasioning re-grouping of areas studied.

II.--Ribes viscosissimum, in the areas studied occurred less frequently than R. lacustre. It enters the burned areas later than R. lacustre and its increase is slower. Data collected do not warrant even tentative statements as to time of maximum or decrease. It appears more frequently in dry situations than R. lacustre. It shows a peculiar tenacity in deep shade, frequently growing with a tuft of two or three leaves at the end of a single stem many feet in length, a habit not observed in R. lacustre.

The most positive and perhaps most important conclusion possible is that a species must be considered as a separate ecological entity and there can be no ecology of the genus Ribes but instead each species must be dealt with separately.

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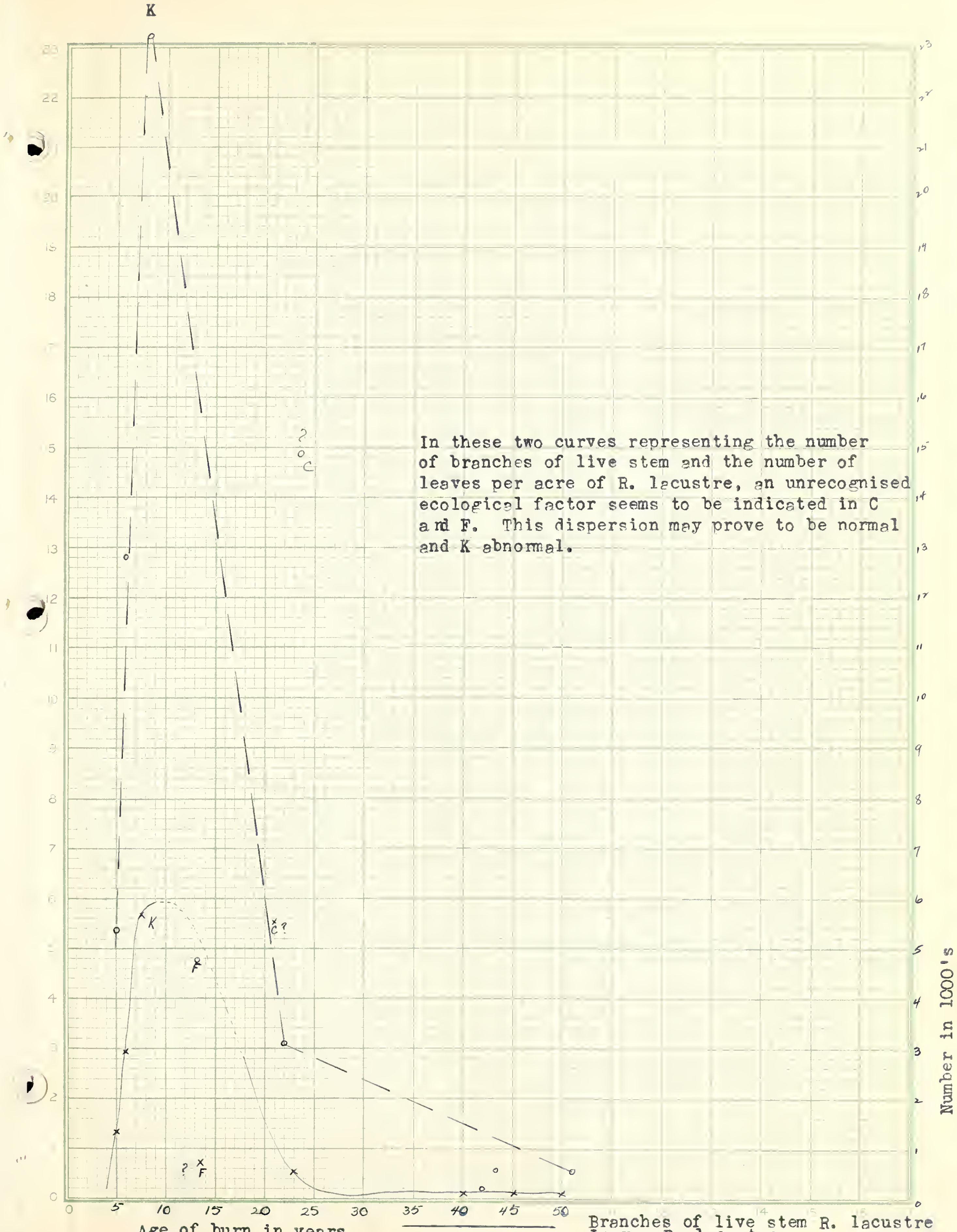
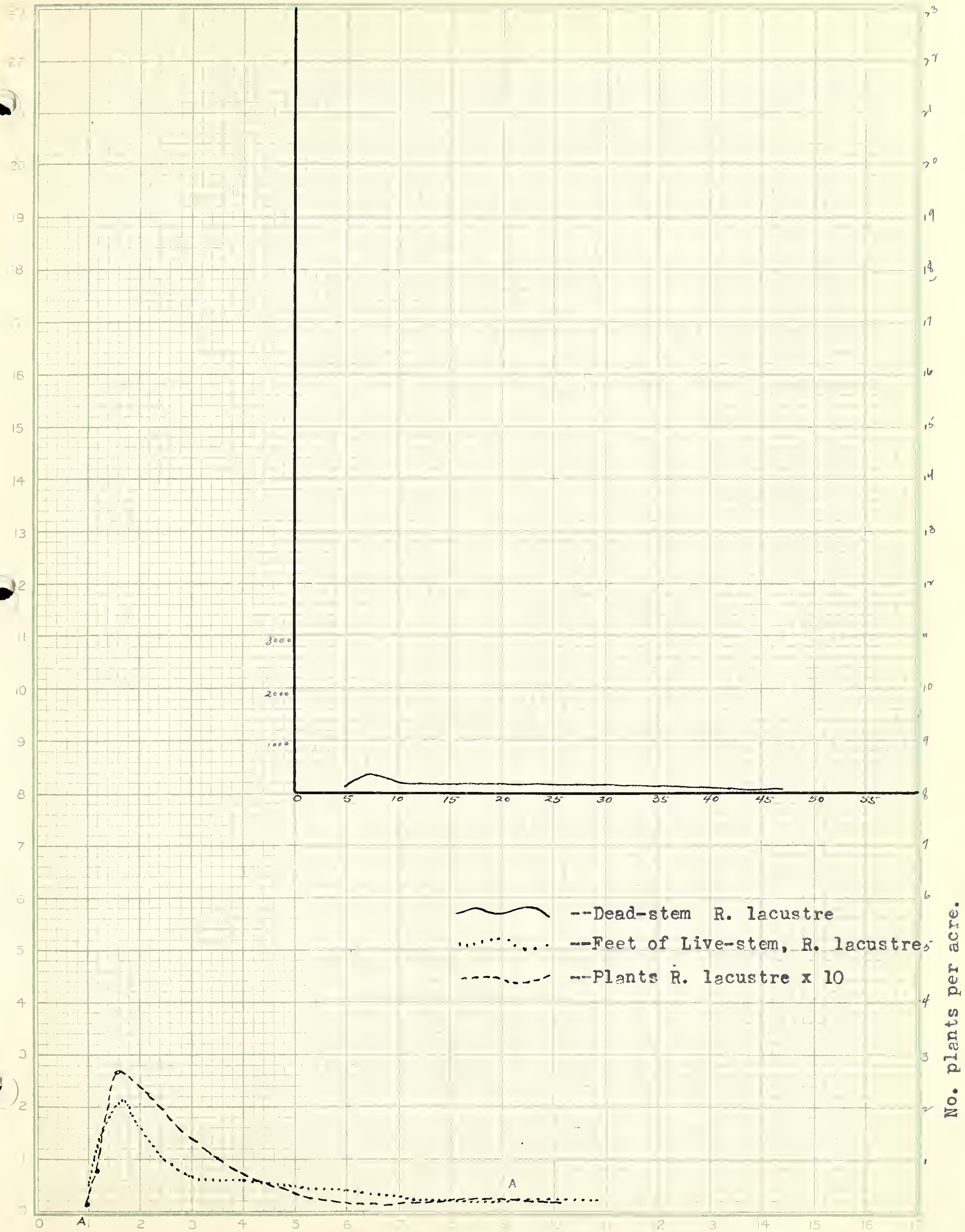


In these two curves representing the number of branches of live stem and the number of leaves per acre of R. lacustre, an unrecognised ecological factor seems to be indicated in C and F. This dispersion may prove to be normal and K abnormal.


--Dead-stem R. lacustre
--Feet of Live-stem, R. lacustre
--Plants R. lacustre x 10
No. plants per acre.
Age of burn
A
3000
2000
1000
0
5
10
15
20
25
30
35
40
45
50
55

REPORT ON COOPERATIVE BLISTER RUST CONTROL WORK BETWEEN WESTERN Office of White Pine Blister Rust Control and Inland Empire Protective Associations.

* * * * * * * * * *

In view of the fact that the White Pine Blister Rust is rapidly approaching the white pine stands of the Inldan Empire it was deemed desirable that definite steps be taken to start some field work in the different timber protective associations with the ultimate object of protecting their stands of timber from this disease.

During the past summer season a two man crew has been carrying on a similar project in each of the assocations. For this work one man was provided by each association and one man from the Office of Blister Rust Control.

The objects to be attained were three-fold, first that of an educational nature; second to scout for the disease, and third reconnaissance studies. The educational work consisted in interviewing all members of the association at their stations, and by the display of specimens of the disease and discussion make them as familiar with the disease as possible; further to call their attention to the native Ribes of their region so that they would recognize them. It was expected by this method to make potential scouts of the employees of the association so that in the course of their work they could scout for the disease.

The reconnaissance work in the association consisted in running strip lines over different areas to determine the different kinds of wild currants and gooseberries that occurred on the area, their relative abundance, as well as some data on other factors such as brush, windfall, topography etc., which have a bearing upon the eradication problem.

Training of Personnel

All of the men employed upon this work were temporary men who were unfamiliar with blister rust work. In order to prepare these men for their summer's work a school was conducted in the woods about 12 miles north of Upper Priest Lake, from June 18 to 30. During this period all phases of the present known information regarding blister rust were gone over thoroughly. Further, the men were required to work a few days on eradication crews and reconnaissance crews under close supervision so that they would know exactly how the control work was accomplished. In the reconnaissance training they were asked to do the same work, then their results were compared. By this latter means a uniform basis for judging different conditions was established.

The following tables give a summary of the summer's work in all of the associations in northern Idaho:

TABLE XLIII

Summary of Cooperative Blister Rust Work with Protective Associations

Association	Interviews: With Association Men	Interviews: With others	Area of Association (Acres)	Miles Traveled by Educational Men: Foot	Miles Traveled by Educational Men: Auto	Number of Reconnaissance Transects Run	Cooperation Provided by Association: Transportation: Miles	Cost of Transportation @ 10¢	Meals: Association Man: Number	Meals: Association Man: @ 45¢	Meals: Blister Rust Man: Number	Meals: Blister Rust Man: @ 45¢	Salary Association Man	Cooperation Provided by Blister Rust: Total Expense Blister Rust Man	Training Association Men	Total Expense: Association	Total Expense: Blister Rust	Species of Ribes Found: Prickly Currant	Sticky Currant	White Stemmed Gooseberry	Wild Black Currant	Inland Black Gooseberry
Priest Lake	10	8	212286	113	0	2076	42	4.20	228	102.60	183	82.35	224	384.33	26.70	423.15	411.03	x	x	x	x	
Coeur d'Alene	67	20	1843000	676	1590	5548 393	100	10.00	621 218	200.79 98.10	46	20.70	510	1646.62 689.01	26.70	732.80 638.80	1646.62 715.71	x	x	x	x	x
Pend Orielle	20	30	700000	40	270	1794	270	27.00	190	85.50	0	0	230	556.36	26.70	342.50	583.06	x	x	x	x	
Potlatch	36	30	806400	402	3	1785	370	37.00	372	167.40	372	167.40	216	320.26	26.70	587.80	346.96	x	x	x	x	x
Clearwater	51	58	702760	375	133	1165	133	13.30	211	94.95	211	94.95	216	498.34	26.70	419.20	525.04	x	x	x	x	x
	184	146	4264446	1606	1996	12761	915	100.65	1840	749.34	812	365.40	1396	4094.92	133.50	3144.25	4228.42					

TABLE XLIV

– DATA ON CHARACTERISTICS OF EMPLOYEES OF ASSOCIATIONS

Name of Association	No. Employees	Experienced Woodsmen	Interested In Forestry			Years on Ass'n			Familiar with Ass'n		College Men		Interested in Blister Rust			Will do Scouting		Knowledge of Blister Rust		
			Much	Some	No	First	Second	Three or more	Yes	No	Yes	No	Much	Little	None	Yes	No.	Familiar	Little	None
Priest Lake	10	5	0	3	7	10	0	0	0	10	0	10	4	4	2	2	8	0	0	10
Coeur d'Alene	67	56	44	3	20	22	4	41	60	7	0	67	39	13	15	33	34	3	36	28
Pend Oreille	20	15	16	4	0	5	4	11	18	2	3	17	17	3	0	17	3	2	8	10
Potlatch	35	29	0	29	6	16	4	15	31	4	6	29	25	4	6	26	9	12	0	23
Clearwater	60	51	49	0	11	24	12	24	39	21	7	53	38	9	13	42	18	6	16	38
Total	192	156	109	39	44	77	24	91	148	44	16	176	123	33	36	120	72	23	60	109

Table 43 gives a summary of the summer's work in all of the associations in northern Idaho. The first set of figures given for the Priest Lake Timber Protective Association is for the work done by the two men who were doing educational work, scouting and some reconnaissance work while the second set of figures is for the men who were doing only reconnaissance work. A full report of the latter work is given under D (3.52) Page 120.

Results of Summer's Work on Priest Lake Timber Protective Association.

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 10 employees of the Association who were interviewed, none had any previous knowledge of blister rust. Most of these men became interested in blister rust and were on the lookout for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the Association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the disease:

In traveling from station to station the two men engaged in blister rust educational work traveled on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examination of these areas no blister rust was found to be present. As far as is known at present the Association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance Work:

Table 43 shows that 11756 chains of reconnaissance strips one rod wide on 23512 acres were run in the Association by the four crews

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that were in the field last season. The map which accompanies this report shows the areas where the reconnaissance work was done. All records and maps made during this work are on file in this Office and are available to the Association. The strips were generally run every quarter mile and at a stream, at right angles to the contour lines toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, topography and other factors which will influence the cost of Ribes eradication.

Table 45 gives a brief summary of the conditions on each of these areas without reference to age classes.

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TABLE XLV
Summary of Condition on Sample Areas on Priest Lake Timber Protective Association

Area: Name	Size (Acres)	Elev.	Timber Stand	No. Chains Strips	Timber per Acre: White Pine	Timber per Acre: Mixed	Brush: Ht. Ft.	Brush: Density %	Ribes per Acre: Prickly Currant	Sticky Currant	White Stemmed Gooseberry	Total
Indian Creek		2350	D.F.		Mature 8 DBH 8" -18"	Mature 39 DBH 8" -24"						
T.61 N.-R.4W.-W½ Sec.	726	to	W.F.Y.	363	Poles 5 Age 60-100	Poles 29 Age 70-175	3	20	16	113		129
23; W½, Sec.26, S.E.¼		3316	P.W.P.		Rep. 113 Age 10-35	Rep. 1060 Age 15-60						
Sec.22; N.W.¼ Sec.27			C.-H.									
S.Fork-Hunt Creek		4500	S-W.F.		Mature 26 DBH 12-30	Mature 84 DBH 8"-30"						
T.60 N.R.3W.S.½	392	To	W.P.	196	Poles 2 Age 100-180	Poles 67 Age 150-200	2	15	23	--	--	23
Sec.8-N.½ Sec.17		5668	C-H		Rep. 64 Age 10-40	Rep. 736 Age 40-80						
Soldier Creek		3000	W.F.C.		Mature 6 DBH 8-18	Mature 75 DBH 8-20						
T.59 N-R.4W.N.½	242	to	H.-W.P.	121	Poles 5 Age 70-100	Poles 59 Age 90-120	5	15	21	110	--	131
Sec. 2		3340	D.F.		Rep. 185 Age 20-40	Rep. 2356 Age 40-70						
S.End Priest Lake		2350	C.-WpP		Mature 13 DBH 8-18	Mature 66 DBH 8-20						
T.59 N.R.4W.N.½ Sec.	412	to	H.-	206	Poles 20 Age 50-90	Poles 121 Age 75-130	4	15	11	81	--	92
16-S.E.½ Sec. 8		3436	W.F.		Rep. 159 Age 20-40	Rep. 1656 Age 30-60						
Chase Lake & Lost		4063	C - H		Mature 16 DBH 8-40	Mature 107 DBH 8-40						
Creek - T.59 N.-R.4W.	486	to	D.F.-W	243	Poles 4 Age 45-90	Poles 46 Age 90-130	3	20	17	207		224
S.E.¼ Sec.14; N.E. ¼		4950	F.-W.P.		Rep. 76 Age 10-45	Rep. 975 Age 20-80						
Sec.23. S.W.¼ Sec.13												
N.W.¼ Sec. 24												
East River-Middle		2800	D.F.-C		Mature 7 DBH 8-20	Mature 44 DBH 8-22						
Fork-T.58.N.R.4W.Sec.	548	to	W.P.-Y. P. W.F.	274	Poles 7 Age 45-60	Poles 87 Age 45-75	3	20	6	158	9	173
13-S.½ Sec. 12		3734	H.		Rep. 71 Age 15-40	Rep. 418 Age 20-45						
East River- S. Fork		2750	C-W.P.		Mature 18 DBH 8-12	Mature 42 DBH 8-28						
T.58 N.R..E4W Center	374	to	D.F.	187	Poles 64 Age 50-80	Poles 143 Age 60-100	3	20	7	189	--	196
½ Sec. 24		3800	Y.P.-H		Rep. 73 Age 25-40	Rep. 377 Age 15-50						

TABLE XIV

Summary of Condition on Sample Areas on Priest Lake Timber Protective Association

Area: Name	Size (Acres)	Elev.	Timber: Stand	No. Chains Strips	Timber per Acre: White Pine	Mixed	Brush: Ht. Ft.	Density %	Ribes per Acre: Prickly Currant	Sticky Currant	White Stem Gooseberry	Total
Indian Creek T.61 N.-R.4W.-1/2 Sec. 23;1/2,Sec.26,S.E.1/4 Sec.22;N.W.1/4 Sec.27	726	2350 to 3316	D.F. W.F.Y. P.W.P. C.-H.	363	Mature 8 DBH 8"-18" Poles 5 Age 60-100 Rep. 113 Age 10-35	Mature 39 DBH 8"-24" Poles 29 Age 70-175 Rep. 1060 Age 15-60	3	20	16	115		129
S.Fork-Hunt Creek T.60 N.R.3W.S.1/2 Sec.8-N.1/2 Sec.17	392	4500 To 5668	S-W.F. W.P. C-H	156	Mature 26 DBH 12-30 Poles 2 Age 100-180 Rep. 64 Age 10-40	Mature 84 DBH 8"-30" Poles 67 Age 150-200 Rep. 736 Age 40-60	2	15	23	—	—	23
Soldier Creek T.59 N-R.4W.N.1/2 Sec. 2	242	3000 to 3340	W.F.C. H.-W.P. D.F.	121	Mature 6 DBH 8-18 Poles 5 Age 70-100 Rep. 185 Age 20-40	Mature 75 DBH 8-20 Poles 59 Age 90-120 Rep. 2356 Age 40-70	5	15	21	110	—	131
S.End Priest Lake T.59 N.R.4W.W.1/2 Sec. 16-S.E.1/4 Sec. 8	412	2350 to 3436	C.-WP H.- W.F.	206	Mature 13 DBH 8-18 Poles 20 Age 50-90 Rep. 159 Age 20-40	Mature 66 DBH 8-20 Poles 121 Age 75-130 Rep. 1656 Age 30-60	4	15	11	81	—	92
Chase Lake & Lost Creek - T.59 N.-R.4W. S.1/2 Sec.14;N.E.1/4 Sec.23,S.W.1/4 Sec.13 N.W.1/4 Sec. 24	486	4063 to 4950	C - H D.F.-W F.-W.P.	243	Mature 16 DBH 8-40 Poles 4 Age 45-90 Rep. 76 Age 10-45	Mature107 DBH 8-40 Poles 46 Age 90-130 Rep. 975 Age 20-80	3	20	17	207		224
East River-Middle Fork-T.58.N.R.4W.Sec 13-S.1/2 Sec. 12	548	2800 to 3734	D.F.-C. F.-Y. W.F. H.	274	Mature 7 DBH 8-20 Poles 7 Age 45-60 Rep. 71 Age 15-40	Mature 44 DBH 8-22 Poles 87 Age 45-75 Rep. 418 Age 20-45	3	20	6	158	9	173
East River- S. Fork T.58 N.R.,R4W Center 1/2 Sec. 24	374	2750 to 3800	C-W.P. D.F. Y.F.-H	187	Mature 18 DBH 8-12 Poles 64 Age 50-80 Rep. 73 Age 25-40	Mature 42 DBH 8-28 Poles 143 Age 60-100 Rep. 377 Age 15-50	3	20	7	189	—	196

Results of Summer's Work on Pend Oreille Timber
Protective Association

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on current leaves (incelluloid cases) were provèded for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 20 men interviewed 10 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the Disease:

In traveling from station to station the two men engaged in blister rust work traveled on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examination of these areas no blister rust was found to be present. As far as is known at present the association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance Work:

Table 43 shows that 1794 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, topography and other factors which will influence the cost of eradication.

Results of Summer's Work on Pend Oreille Timber Protective Association

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (unofficial cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 20 men interviewed 10 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men are interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the Disease:

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III. Reconnaissance Work:

Table 43 shows that 1794 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, topography and other factors which will influence the cost of eradication.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 46.

A. Area in
T.59 R. 2W. Sec. 35

This is a small area of about 70 acres which was burned over in 1919. Since the burn is quite recent there is very little reproduction on the area. At present there are about six larch seedlings per acre. Wild currants and gooseberries have not as yet reestablished themselves.

B. Area in
T. 59, R. 2 W., Sec. 3, 4, 9, and 10.

This area of approximately 152 acres is of 1903 burn. The present stand consists of a mixture of white pine, cedar, larch and hemlock, mostly under 18 year old. There is an average of 272 poles per acre, about 18 years old and 3194 seedlings about 8 years old. About 15% of the stand is white pine. The prickly and sticky currant and the white stemmed gooseberry were found on the area, averaging about 23 bushes per acre. They appear to be quite generally distributed over the area.

C. Area in Upper Pack River Drainage.
T.60, R. 2W, Sec. 4, 5, 6.
T.61, R. 2W, Sec. 28, 29, 32, 33.

This area of about 928 acres represents a white pine, cedar, white fir, hemlock forest in its virgin state lying on the upper drainage of Pack River. There is an average of about 174 mature trees per acre, 12-36 inches in diameter, 357 poles, 30 to 50 years old and a heavy understory of reproduction of 3194 trees, 15 to 20 years old. Of the entire stand white pine makes up about 3½ percent. Since this is primarily a mature stand a better idea of the importance of white pine in the stand is gained when it is realized that about 30% of the mature trees is white pine. The only wild currants found on the area, the prickly currant, which appears to be quite generally distributed, averages about 41 bushes per acre.

D. Pack River
T. 60, R. 2W. Sec. 4 and 9

This is a small area of 1910 burn lying northeast of Pack River chiefly in Sections 4 and 9. One strip was run across this area. There is very little mature timber or poles left on the area but there is an average of 5488 seedlings per acre, of which 22 percent is white pine. Only one species of Ribes is established on the area, the prickly currant, averaging 6 bushes per acre.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 46.

A. Area in
T.59 R. 2W. Sec. 35

This is a small area of about 70 acres which was burned over in 1919. Since the burn is quite recent there is very little reproduction on the area. At present there are about six larch seedlings per acre. Wild currants and gooseberries have not as yet reestablished themselves.

B. Area in
T. 59, R. 2 W., Sec. 3, 4, 9, and 10.

This area of approximately 152 acres is of 1903 burn. The present stand consists of a mixture of white pine, cedar, larch and hemlock, mostly under 18 year old. There is an average of 272 poles per acre, about 18 years old and 3194 seedlings about 3 years old. About 15% of the stand is white pine. The prickly and sticky currant and the white stemmed gooseberry were found on the area, averaging about 23 bushes per acre. They appear to be quite generally distributed over the area.

C. Area in Upper Pack River Drainage.
T.60, R. 2W, Sec. 4, 5, 6.
T.61, R. 2W, Sec. 28, 29, 32, 33.

This area of about 925 acres represents a white pine, cedar, white fir, hemlock forest in its virgin state lying on the upper drainage of Pack River. There is an average of about 174 mature trees per acre, 12-36 inches in diameter, 257 poles, 30 to 50 years old and a heavy understory of reproduction of 3194 trees, 15 to 20 years old. Of the entire stand white pine makes up about $3\frac{1}{2}$ percent. Since this is primarily a mature stand a better idea of the importance of white pine in the stand is gained when it is realized that about 30% of the mature trees is white pine. The only wild currants found on the area, the prickly currant, which appears to be quite generally distributed, averages about 41 bushes per acre.

D. Pack River
T. 60, R. 2W. Sec. 4 and 9

This is a small area of 1910 burn lying northeast of Pack River chiefly in Sections 4 and 9. One strip was run across this area. There is very little mature timber or poles left on the area but there is an average of 5488 seedlings per acre, of which 22 percent is white pine. Only one species of Ribes is established on the area, the prickly current, averaging 6 bushes per acre.

E. Little Fall Creek Area
T. 61, R. 1W. Sec. 29, 30, 31 and 32

This area consists of about 1040 acres of virgin white pine, hemlock, cedar and white fir timber on the upper drainage of the North Fork of Pack Creek. On this area there is an averageoof 167 mature trees per acre, 12 to 30 inches in diameter; 292 poles, 30 years old and 1171 seedlings about 10 years old. Of the mature timber 30 percent is white pine. Only one species of Ribes was found, the prickly currant, which averaged only three bushes per acre.

F. Sand Creek Area.
T. 58, R. 2 W., Sec. 33 and 34
T. 57, R. 2 W., Sec. 4 and 5

Most of the drainage of Sand Creek was burned over during 1894. Approximately 744 acres in the center of this area, about half on each side of the creek, were studied. The present stand consists of poles and reproduction of white pine, cedar, Douglas fir, Larch and hemlock. The 454 poles per acre are about 20 years old while the 1273 seedlings are about 10 years old. About 24 percent of the stand is white pine. Two species of Ribes were found on the area, the sticky currant and the prickly currant. These two averaged about 39 bushes per acre.

G. Lightning Creek Area
T. 58, R. 1 E., Sec. 10, 11, 15 and 22.

This is a mature stand composed of white pine, cedar, hemlock and Douglas fir, located on the south side of Lightning Creek in the above sections. About 528 acres were examined in this area. The stand averages 335 trees per acre, 12 to 30 inches in diameter; 599 poles 50 years old; and 1846 trees under pole size, about 30 years old. Of the trees larger than poles, 35 percent is white pine. The prickly currant, averaging 6 bushes per acre, was the only Ribes found on the area.

E. Little Fall Creek Area
T. 61, R. 1 W., Sec. 29, 30, 31 and 32

This area consists of about 1040 acres of virgin white pine, hemlock, cedar and white fir timber on the upper drainage of the North Fork of Pack Creek. On this area there is an average of 157 mature trees per acre, 12 to 30 inches in diameter; 292 poles, 30 years old and 1171 seedlings about 10 years old. Of the mature timber 70 percent is white pine. Only one species of Ribes was found, the prickly current, which averaged only three bushes per acre.

F. Sand Creek Area.
T. 53, R. 2 W., Sec. 33 and 34
T. 57, R. 2 W., Sec. 4 and 5

Most of the drainage of Sand Creek was burned over during 1894. Approximately 744 acres in the center of this area, about half on each side of the creek, were studied. The present stand consists of poles and reproduction of white pine, cedar, Douglas fir, larch and hemlock. The 454 poles per acre are about 20 years old while the 1273 seedlings are about 10 years old. About 24 percent of the stand is white pine. Two species of Ribes were found on the area, the sticky currant and the prickly currant. These two averaged about 39 bushes per acre.

G. Lightning Creek Area
T. 56, R. 1 E., Sec. 10, 11, 15 and 22.

This is a mature stand composed of white pine, cedar, hemlock and Douglas fir, located on the south side of Lightning Creek in the above sections. About 525 acres were examined in this area. The stand averages 335 trees per acre, 12 to 30 inches in diameter; 599 poles 50 years old; and 1846 trees under pole size, about 30 years old. Of the trees larger than poles, 35 percent is white pine. The prickly currant, averaging 6 bushes per acre, was the only Ribes found on the area.

TABLE XLVI

Summary of Reconnaissance Work on Pend Orielle Timber Protective Association

Area: Name	Size (Acres)	Elev.	Timber Stand	No. Chains Strips	Timber per Acre: White Pine		Timber per Acre: Mixed		Brush Ht. Ft.	Density %	Ribes per Acre: Prickly Current	Sticky Current	White Stemmed Gooseberry	Total
A-		2100-	Larch	35	Mature	0 DBH 0	Mature	1 DBH 24"	4	70	0	0	0	0
T. 59 R. 2 W.	70	2725	1919 Burn		Poles	0 Age 0	Poles	0 Age 0						
Sec. 35					Seedlings	0 Age 0	Seedlings	6 Age 3						
B-T. 59. R. 2 W.		2250-	W.P.-C.L.	76	Mature	0 DBH 0	Mature	1 DBH 20"						
Sec. 3, 4, 9, 10	152	3600	H.		Poles	14 Age 18	Poles	258 Age 18	7	80	3	19	1	23
			1903 Burn		Seedlings	502 Age 8	Seedlings	2692 Age 8						
C-Pack River		3300-	W.P.-C.		Mature	53 DBH 12-30	Mature	121 DBH 14-36						
T. 60 R. 2W Sec.		5150	W.F.-H.		Poles	30 Age 35-50	Poles	327 Age 35-50	6	70	41	0	0	41
4, 5, 6. T. 61 R. 2W	928		Unburned	465	Seedlings	48 Age 15-20	Seedlings	640 Age 15-20						
32, 33, 29, 28														
D-Pack River		3100-	W.P.-C.		Mature	5 DBH 12-30	Mature	22 DBH 12-34						
T. 60 R. 2 W.	120	4250	L.P. W.F-H	58	Poles	2 Age 50	Poles	6 Age 50	7	80	6	0	0	6
Sec. 9, 4			1910 Burn		Seedlings	1220 Age 10	Seedlings	4268 Age 10						
E-Little Fall		3460-	W.P.-H.	526	Mature	50 DBH 14-28	Mature	117 DBH 12-32						
Creek T. 61	1040	4500	C.-W.F.		Poles	10 Age 30	Poles	282 Age 30	4	60	3	0	0	3
R. 1 W. Sec. 29,					Seedlings	53 Age 10	Seedlings	1113 Age 10						
30, 31, 32														
F-Sand Creek T58		2350-	W.P.-C.		Mature	1 DBH 14-48	Mature	9 DBH 12-30						
R. 2W Sec 33, 34	744	3640	D.F.-L.H.	372	Poles	130 Age 20	Poles	324 Age 20	8	80	17	22	0	39
T57, R. 26, Sec. 54			1894 Burn		Seedlings	283 Age 10	Seedlings	998 Age 10						
G-Lightning Creek		2775	W.P.-C.		Mature	119 DBH 10-30	Mature	216 DBH 12-24						
T.58 R.1E. Sec.	528	3200	H. D.F.	262	Poles	73 Age 50	Poles	426 Age 50	2	3	6	0	0	6
10, 11, 15, 22.			L.P.		Seedlings	41 Age 30	Seedlings	1805 Age 30						

TABLE XLVI

Summary of Reconnaissance Work on Pend Oreille Timber Protective Association

Area: Name	Area: Size (Acres)	Area: Elev.	Timber Stand	No. Chains Strips	Timber per Acre: White Pine	Timber per Acre: Mixed	Brush: Ht. Ft.	Brush: Density %	Ribes per Acre: Prickly Currant	Ribes per Acre: Sticky Currant	Ribes per Acre: White Stemmed Gooseberry	Ribes per Acre: Total
A—T. 59 N. R. 2 W. Sec. 35	70	2100–2725	Larch 1919 Burn	35	Mature 0 DBH 0 Poles 0 Age 0 Seedlings 0 Age 0	Mature 1 DBH 24" Poles 0 Age 0 Seedlings 6 Age 5	4	70	0	0	0	0
B—T. 59 N. R. 2 W. Sec. 3, 4, 9, 10	152	2250–2600	W.P.-D.F.-W.L. H. 1903 Burn	76	Mature 0 DBH 0 Poles 14 Age 15 Seedlings 502 Age 8	Mature 1 DBH 20" Poles 258 Age 15 Seedlings 2692 Age 8	7	80	3	19	1	23
C—Pack River T. 60 N. R. 2 W. Sec. 4, 5, 6, T. 61 N. R. 2 W. 32, 33, 29, 28	928	3300–2150	W.P.-D.F. W.P.-H. Unburned	465	Mature 53 DBH 12–30 Poles 30 Age 35–50 Seedlings 48 Age 15–20	Mature 121 DBH 14–36 Poles 327 Age 35–50 Seedlings 640 Age 15–20	6	70	41	0	0	41
D—Pack River T. 60 N. R. 2 W. Sec. 9, 4	120	3100–4250	W.P.-D.F. L.P.-W.H. 1910 Burn	58	Mature 5 DBH 12–30 Poles 2 Age 50 Seedlings 1250 Age 10	Mature 28 DBH 12–34 Poles 6 Age 50 Seedlings 4260 Age 10	7	80	[illegible]	0	0	9
E—Little Fall Creek T. 61 N. R. 1 W. Sec. 29, 30, 31, 32	1040	2460–4500	W.P.-H. D.F.-W.L.	526	Mature 50 DBH 14–28 Poles 10 Age 30 Seedlings 53 Age 10	Mature 117 DBH 12–32 Poles 282 Age 30 Seedlings 1118 Age 10	4	60	3	0	0	3
F—Sand Creek T. 58 N. R. 2 W. Sec. 33, 34 T. 57 N. R. 2 W. Sec. 5, 4	744	2350–3540	W.P.-D.F. D.F.-L.P. 1894 Burn	372	Mature 1 DBH 14–48 Poles 130 Age 20 Seedlings 283 Age 10	Mature 9 DBH 12–30 Poles 524 Age 20 Seedlings 993 Age 10	[illegible]	80	17	22	0	39
G—[illegible] Creek T. 58 N. R. 1 W. Sec. 10, 11, 15, 22	528	2775–3700	W.P.-D.F. W. D.F. L.P.	262	Mature 119 DBH 10–30 Poles 73 Age 30 Seedlings 41 Age 30	Mature 216 DBH 12–24 Poles 426 Age 50 Seedlings 1305 Age 30	2	3	6	0	0	6

Results of Summer's Work on Potlatch Timber Protective Association.

1. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 20 men interviewed 10 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the disease:

In traveling from station to station the two men engaged in blister rust work traveled nearly 400 miles on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examination of these areas no blister rust was found to be present. As far as is known at present the association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance work:

Table 43 shows that 1794 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, topography and other factors which will influence the cost of eradication.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 47.

A. Moore Creek Area; T.41 R. 1W. Sec. 14, 15, 22, 23, 26, 27, 34
35.

This area of approximately 2500 acres was cut over and burned during the years 1908-1914. The reproduction now represent a stand of white pine,

Results of Summer's Work on Potlatch Timber Protective Association.

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white p[ine] (in glass tubes) and on current leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rou[gh] classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blist[er] rust. This table shows that of the 20 men interviewed 10 had some previo[us] knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the disease:

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III. Reconnaissance work:

Table 45 shows that 1794 chains of reconnaissance strips were the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, topography and other factors which will influence the cost of eradication.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 47.

A. Moore Creek Area; T.41 R. 1E. Sec. 14, 15, 22, 23, 26, 27, 35.

This area of approximately 2500 acres was cut over and burned during the years 1908-1914. The reproduction now represent a stand of white pine,

white fir, and larch. There is an average of 122 trees of an average age of 10 years on the area, 45, or approximately 38 percent, of which are white pine. The area is fairly free from Ribes, averaging only three plants of Prickly Currant per acre. Other conditions are found on the area are shown in the summary table.

B. Len Boehls Area:
T.41 R. 4 E. Sec. 35 East of River and Sec. 36
T.41 R. 5 E. Sec. 31 Western half.
T.40 R. 4 E. Sec. 2 East of river and all of Sec. 1

This area represents a western slope on the east side of the Little North Fork, or approximately 1536 acres. It was probably burned over in about 1900. The slope is covered with white pine, cedar Douglas fir, and white fir. An average per acre of 14 trees 10 to 22 inches DBH; 40 poles 25 to 40 years old and 511 young trees 4-20 years old, were found on the area. Of these totals there was an average of 1 mature, 4 poles and 70 trees reproduction of white pine per acre or approximately 13% white pine. The Sticky Currant, the only species of Ribes found, averaged 19 bushes per acre. More detailed details regarding the area are shown in the summary table.

C. Cranberry Creek Area:
T. 39 R. 3 E. Sec. 32
T. 38 R. 3 E. Sec. 5 North half.

Most of this area is rather flat. The timber type is white pine, white fir, cedar, consisting of trees 100 to 150 years old with an understory of young growth 30-60 years old. The area averaged 67 trees per acre, 14 to 36 inches DBH 83 poles 50 to 150 years old and 265 trees under pole size, 30 to 60 years old. Of this number there is the following white pine per acre: 14 mature class, 6 poles and 21 under pole size or approsimately 10% white pine. The area is practically Ribes free, averaging less than one prickly currant per acre. Sticky currant, however, occurs in patches in the small areas cleared by homesteaders. More complete data are given in the summary table.

D. Mason Meadows Area on Dick's Creek.
T. 38 R. 1 E., South half of sec. 7 and 8 and north half of Sec. 18 and 19.

This area of appro ximately 1088 acres is located on the upper drainage of the south fork of Dick's Creek. It is bounded on practically all sides by old burns 1894 and 1896. These burns now represent reproduction thickets. The timber on the area is white pine, cedar and white fir. The area averaged 66 trees per acre 14 to 32 inches DBH, 79 poles 50-130 years old, and 511 trees under pole size 10 to 50 years old. Of this number there were 12 mature, one pole and 46 trees reproduction of white pine per acre of about 9 % white pine. The Prickly Currant, the only species found on the area averaged 3 bushes per acre. The summary table gives more details regarding the area.

TABLE XLVII

Summary of Reconnaissance Work on Potlatch Timber Protective Association

Area: Name	Area: Size (acre)	Area: Elev.	Timber Stand	No. Chains Strip	Timber per Acre: White Pine	Timber per Acre: Mixed	Brush: Ht. Ft.	Brush: Density	Ribes per Acre
Moose Creek		2850-	W.P.		Mature 0 DBH 0	Mature 0 DBH 0			
T.41 R.1W. Sec.	2500		W.F.	627	Poles 0 Age 0	Poles 0 Age 0	2	30	3 Prickly
14,15,22, 23,26		2900	L.		Rep. 46 Age 10	Rep. 76 Age 10			Currant
27,34,35.			1908-14						
			cut						
Len Boehls			W.P.		Mature 1 DBH 10-22	Mature 13 DBH 10-22	5	60	19 Sticky
T.41 R.4E.		1545-	C.		Poles 4 Age 25-30	Poles 36 Age 25-40			
Sec. 35,36									
T.41 R.5E	1536	3035	D.F.	385	Rep. 70 Age 3-20	Rep. 441 Age 4-20			Currant
Sec. 31 T. 40									
R. 4 E.Sec. 1,2									
Cranberry Creek			W.P.		Mature 14 DBH 14-36	Mature 53 DBH 10-32			
T.39 R.3E Sec32	1080	1965-	Cedar	539	Poles 6 Age 50-100	Poles 77 Age80-150	3	70	1 Sticky
T.38 R.3E Sec.5		3300	W.F.		Rep. 21 Age 10-30	Rep. 244 Age 30-60			Currant
Dick's Creek			W.P.		Mature 12 DBH 14-28	Mature 54 DBH 14-32			
T.38 R.1E.		4000-	W.F.	234	Poles 1 Age 50-60	Poles 78 Age80-150	3	30	3 Prickly
Sec. 7,8,18,19	1088	4310	C.		Rep. 46 Age 10-40	Rep. 465 Age 15-50			

Results of Summer's Work on Clearwater Timber Protective Association

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table No.44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 60 men interviewed 24 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the Disease.

In traveling from station to station the two men engaged in blister rust work traveled 375 miles on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examintion of these areas no blister rust was found to be present. As far as is known at present the association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance Work:

Table 43 shows that 1167 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, Topography and other factors which will influence the cost of eradication.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 48.

A. White Pine Creek Area--T.40N, R. 6E, Sec. 15 and 22.

This is a stand of timber 14 to 24 inches in diameter, 74% of which is white pine. Two species of Ribes were found in the area, the prickly currant and the sticky currant. The prickly currant usually oocurs along streams and springy places. This sample area was found to have on an average 52 Ribes bushes per acre.

Results of Summer's Work on Clearwater Timber
Protective Association

I. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table No.44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodsmen, whether they were interested in general forestry, and their apparent reaction to blister rust. This table shows that of the 50 men interviewed 24 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the Disease.

In traveling from station to station the two men engaged in blister rust work traveled 375 miles on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examination of these areas no blister rust was found to be present. As far as is known at present the association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance Work:

Table 45 shows that 1167 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contours toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall, Topography and other factors which will influence the cost of eradication.

The following is a brief statement of the results of the reconnaissance work on each of the areas studied. More complete information is contained in Table 48.

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B. Beaver Creek Area
T.39, R.6E, Sec. 6 and 8
T.39, R.5E, Sec. 1 and 2
T.40, R.5E, Sec. 35

The part of this area which lies in Sections 1, 2 and 35 is an old burn with Bertha Hill as its center while that portion in Sections 6 and 8 is in virgin timber. Both in the reproduction and in the virgin timber white pine runs from 33 to 50% of the stand. Three species of Ribes were found on the area, the prickly, sticky and stink currant. The prickly and sticky currants are generally distributed over the area and average 55 bushes per acre. The stink currant occurs in dense mats along all of the streams except the small ones which flow down through narrow canyon channels. In a narrow belt about 20 to 40 feet along most of the streams the stink currant will average 500 to 600 bushes per acre.

C. West Beaver Creek
T.39, R.6E. Sec. 7

The study of a small portion of this territory indicates that there is a good stand of mature timber 12" to 42" in diameter with an understory of reproduction 5 to 15 years old. About 33% of the stand is white pine. The prickly and sticky currant were found generally distributed over the area, averaging 70 bushes per acre. The stink currants were found in dense mats along the streams.

D. Alder Creek
T.39, R.5E, Sec. 22, 23, 24 and 25

This is an old burn with very little mature timber on the area. However, there is a good stand of poles and reproduction on the area running from 5 to 40 years old. About 34 per cent of this stand is white pine. The prickly and sticky currant were generally distributed over the area, averaging 312 bushes per acre. The pine seemed to have killed out all the stink currants which normally occur along the streams in this region.

E. North Fork Reeds Creek.
T.38 N, R.5E. Sec 14, 15, 16 and 21

This is a virgin stand of timber averaging from 10 to 26 inches in diameter. About 75 percent of the stand is white pine. There is also a good stand of poles 30 to 60 years old, about 50 percent white pine. The heavy understory of reproduction is chiefly other species than white pine. The prickly currant was found generally distributed over the area, averaging 19 bushes per acre. In the boggy places and along the larger streams dense patches of the stink currant were found.

F. South Fork of Reeds Creek.
T.38, R. 5E, Sec. 22, 23, 26, 27.

This is a virgin stand of timber composed of about 30 percent white pine. The prickly and sticky currant averaged 12 bushes per acre. Stink currant occurs in dense patches along the streams.

B. Beaver Creek Area
T.39, R.6E, Sec. 6 and 8
T.39, R.5E, Sec. 1 and 2
T.40, R.5E, Sec. 35

The part of this area which lies in Sections 1, 2 and 35 is an old burn with Bertha Hill as its center while that portion in Sections 6 and 8 i in virgin timber. Both in the reproduction and in the virgin timber white pine runs from 33 to 50% of the stand. Three species of Ribes were found on the area, the prickly, sticky and stink currant. The prickly and sticky cur rants are generally distributed over the area and average 55 bushes per acre The stink currant occurs in dense mats along all of the streams except the small ones which flow down through narrow canyon channels. In a narrow belt about 20 to 40 feet along most of the streams the stink currant will average 500 to 600 bushes per acre.

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D. Alder Creek
T.39, R.5E, Sec. 29, 23, 24 and 25

This is an old burn with very little mature timber on the area. However, there is a good stand of poles and reproduction on the area running from 5 to 40 years old. About 34 per cent of this stand is white pine. The prickly and sticky current were generally distributed over the area, averaging 312 bushes per acre. The pine seemed to have killed out all the stink currants which normally occur along the streams in this region.

E. North Fork Reeds Creek.
T.38 N, R.5E. Sec 14, 15, 16 and 21

This is a virgin stand of timber averaging from 10 to 26 inches in diameter. About 75 percent of the stand is white pine. There is also a goo stand of poles 30 to 60 years old, about 50 percent white pine. The heavy understory of reproduction is chiefly other species than white pine. The prickly currant was found generally distributed over the area, averaging 19 bushes per acre. In the boggy places and along the larger streams dense patches of the stink currant were found.

F. South Fork of Reeds Creek.
T.38, R. 5E, Sec. 22, 23, 26, 27.

This is a virgin stand of timber composed of about 30 percent whit pine. The prickly and sticky currant averaged 12 bushes per acre. Stink currant occurs in dense patches along the streams.

G. Scofield Creek
T.38, R. 6E, Sec. 5

This area is part of a 1914 burn. The reproduction represents an average per acre of 1596 seedlings 5 to 10 years old. 80 percent of the reproduction is white pine. The prickly currant was the only Ribes found on the area. It averaged 126 bushes per acre and was distributed quite generally.

TABLE XLVIII

Summary of Reconnaissance Work on Clearwater Timber Protective Association

Area: Name	Size (Acres)	Elev.	Timber: Stand	No. Chains Strips	Timber per Acre: White Pine	Timber per Acre: Mixed	Brush: Ht. Ft.	Brush: Density %	Ribes per Acre: Prickly Currant	Sticky Currant	Stink Currant	Total
White Pine Creek		3000-	W.P.		Mature 132 DBH 14-24	Mature 47 DBH 14-18						
T. 40, R. 6 E.	288	4044	W.F.	144	Poles 19 Age 30-60	Poles 42 Age 40	3	50	50	2	0	52
Sec. 15, 22.			S.		Rep. 39 Age 4-15	Rep. 96 Age 5-12						
Beaver Creek, T. 39, R. 6E		3500-	W.P.		Mature 250 DBH 14-38	Mature 26 DBH 10-29						
Sec. 6, 8. T. 39, R. 5E. Sec. 1	556	5550	W.F.-C	278	Poles 43 Age 28-42	Poles 94 Age 40-58	4	50	42	13	*	55
2. T. 40, R. 5E. Sec. 35.			D.F.		Rep. 345 Age 5-13	Rep. 685 Age 10-40						
West Beaver Creek		3400-	W.P.-H		Mature 28 DBH 21-42	Mature 57 DBH 12-26						
T. 39, R. 6E., Sec. 7	96	3660	W.F.	56	Poles 11 Age 15-55	Poles 90 Age 30-45	3	40	65	0	5	70
					Rep. 300 Age 5-15	Rep. 630 Age 15						
Alder Creek		3300-	W.P.		Mature 4 DBH 12-36	Mature 11 DBH 12-26						
T. 39, R. 5 E.	310	4465	D.F.	155	Poles 79 Age 15-20	Poles 135 Age 15-40	5	66	45	279	0	312
Sec. 22, 23, 24, 25.			W.F.		Rep. 449 Age 5-10	Rep. 886 Age 10-15						
West Fork Reeds Creek		3000-	W.P.		Mature 103 DBH 10-26	Mature 39 DBH 10-26						
T. 38 N., R. 5E.,	597	3340	W.F.	299	Poles 61 Age 30-60	Poles 75 Age 25-50	3	30	19	---	**	19
Sec. 14, 15, 16, 21			D.F.-C		Rep. 45 Age 5-25	Rep. 488 Age 5-25						
South Fork Reeds Creek		3185-	W.P.		Mature 80 DBH 10-26	Mature 50 DBH 10-26						
T. 38, R. 5E, Sec. 22.	28	3400	W.F.	139	Poles 49 Age 40-60	Poles 76 Age 35-70	2	30	11	1	0	12
23, 26, 27.					Rep. 98 Age 8-20	Rep. 440 Age 3-20						
Scofield Creek			W.P.		Mature 0 DBH 0	Mature 0 DBH 0						
T. 38, R. 6 E. Sec. 5	40		W.F.	21	Poles 12 Age 40	Poles 38 Age 40	4	30	126	0	0	126
1914 Burn			H.		Rep. 1276 Age 5-10	Rep. 320 Age 5-10						

* Dense mats along streams

** Dense mats along streams

TABLE XVIII

Summary of Reconnaissance Work on Clearwater Timber Protective Association

Area: Name	Area: Size (Acres)	Timber: Elev.	Timber: Stand	No. Chains Strips	Timber per Acre: White Pine		Timber per Acre: Mixed		Brush: Ht. Ft.	Brush: Density	Ribes per Acre: Prickly Currant	Ribes per Acre: Sticky Currant	Ribes per Acre: Stink Currant	Ribes per Acre: Total
White Pine Creek		3000-	W.P.		Mature 132	DBH 14-24	Mature 47	DBH 14-18						
T. 40, R. 6 E.	288	4044	W.F.	144	Poles 19	Age 30-60	Poles 42	Age 40	3	50	50	2	0	52
Sec. 15, 22.			S.		Rep. 39	Age 4-15	Rep. 96	Age 5-12						
Beaver Creek, T. 39, R.6E		3500-	W.P.		Mature 250	DBH 14-33	Mature 26	DBH 10-29						
Sec.6,8,T.39,R.5½,Sec.1.	556	5550	W.F.-C.	278	Poles 43	Age 28-42	Poles 94	Age 40-58	4	50	42	13	*	55
2, T.40,R.5½.Sec. 35.			D.F.		Rep. 345	Age 5-13	Rep. 685	Age 10-40						
West Beaver Creek		3400-	W.P.-Y.		Mature 28	DBH 21-42	Mature 57	DBH 12-26						
T.39, R. 6E., Sec. 7	96	3660	W.F.	56	Poles 11	Age 15-55	Poles 90	Age 30-45	3	40	65	0	5	70
					Rep. 300	Age 5-15	Rep. 630	Age 15						
Alder Creek		3300-	W.P.		Mature 4	DBH 12-36	Mature 11	DBH 15-26						
T. 39, R. 5 E.	310	4465	[illegible]	155	Poles 79	Age 15-20	Poles 135	Age 15-40	5	60	33	279	0	312
Sec. 22, 23, 24, 25.			W.F.		Rep. 449	Age 5-10	Rep. 886	Age 10-15						
West Fork Beede Creek		3000-	W.P.		Mature 103	DBH 10-26	Mature 79	DBH 10-26						
T.36 N., R. 5E.,	597	3540	W.F.	299	Poles 61	Age 30-60	Poles 75	Age 25-50	3	30	19	----	**	19
Sec.14, 15, 16, 21			D.F.-C.		Rep. 45	Age 5-25	Rep. 488	Age 5-25						
South Fork Beede Creek		3135-	W.P.		Mature 80	DBH 10-26	Mature 50	DBH 10-26						
T.36, R. 5E, Sec. 22.	28	3400	W.F.	139	Poles 49	Age 40-60	Poles 76	Age 35-70	2	30	11	1	0	12
23, 26, 27.					Rep. 98	Age 8-20	Rep. 440	Age 5-20						
Scofield Creek			W.P.		Mature 0	DBH 0	Mature 0	DBH 0						
T.38, R. 6 E. Sec. 5	40		W.F.	21	Poles 12	Age 40	Poles 35	Age 40	4	30	126	0	0	126
1914 Burn			H.		Rep. 1276	Age 5-10	Rep. 320	Age 5-10						

* Dense mats along streams

** Dense mats along stream

Results of Summer's Work on Coeur d'Alene
Timber Protective Association

1. Educational Work:

During the summer as far as possible all members of the Association were visited at their field stations. The whole blister rust situation was discussed with them and specimens of the disease on white pine (in glass tubes) and on currant leaves (in celluloid cases) were provided for their examination. Specimens of the wild currants and gooseberries which were growing in the vicinity of their field station were collected and brought to the station. They were instructed in the methods of recognizing the different species. Table 44 shows the number of such employees with whom contact was established. This table also gives a rough classification of the men as to their experience as woodmen, whether they were interested in general forestry and their apparent reaction to blister rust. This table shows that of the 67 men interviewed 39 had some previous knowledge of blister rust while the remainder had no apparent knowledge of the disease. Most of these men were interested in blister rust and will do some scouting for the disease. Since there appears a possibility of securing active scouting for the disease by most of the members of the association, they should be kept constantly informed regarding the disease and all new members should be instructed each year.

II. Scouting for the Disease:

In traveling from station to station the two men engaged in blister rust work traveled 676 miles on foot. During this time as well as during their scouting around each station these men were constantly on the lookout for the disease. Several specific areas were reported as probably being infected with blister rust, but upon examination of these areas no blister rust was found to be present. As far as is known at present the association territory is free from blister rust. Scouting should be continued so that as soon as blister rust occurs on the association, the facts will be known and immediate action taken to combat it.

III. Reconnaissance Work:

Table 43 shows that 393 chains of reconnaissance strips were run, the records of which are on file in this office. The strips were one rod wide. They were generally started at a stream, and run at right angle to the contoures toward the top of the drainage or to the limits of white pine. In this work complete data were taken on all timber, Ribes, brush, windfall topography and other factors which will influence the cost of eradication.

The following report by Mr. Rodner gives a summary of the preliminary observations on conditions in the Association as observed by these educational men during the summer.

A REPORT ON THE CONDITIONS AS FOUND WITHIN THE BOUNDARIES OF THE COEUR D'ALENE TIMBER PROTECTIVE ASSOCIATION, RELATIVE TO THE BLISTER RUST PROBLEM

by

Jack W. Rodner

* * *

The field work as carried on, during the summer of 1924, falls naturally into two main divisions.

I. Educational.
II. Reconnaissance.

The educational program, which occupied slightly over one third of the total time, proved to be far more successful than was anticipated. It is undoubtedly true that little can be shown in the way of tangible results at the present time. The encouraging feature of this work was the unmistakable interest evidenced by the patrolmen in the field. Almost without exception the men interviewed, requested more information and a more detailed idea of the disease. Throughout the field season many of the patrolmen sent in specimens for examination, proving that the idea of the importance of Blister Rust, had become firmly fixed in their minds. With this large force of men in the field, each with a definite knowledge of the rust, it is more than likely that any isolated infection will be picked up, which otherwise might escape detection for a period of years. The educational program ranks in importance with the reconnaissance work carried on, and will prove a valuable adjunct in Blister Rust Control.

Out of the entire force of seventy-one men, sixty-one men were interviewed during the course of the summer. This will leave, even under unfavorable conditions, a comparatively large force of men in the field next summer, who are familiar with Blister Rust.

The reconnaissance program was, necessarily very extensive. It was evident from the beginning of the field season that it was a hopeless task for two men to attempt an intensive survey of so large an area. All data obtained on specified areas was given as broad an application as conditions and types would warrant. The work is in no sense complete and should be carried on, otherwise the past summers work will mean very little.

The Association may be most handily subdivided into the four main drainage areas; I, The Benewah; II, The St. Maries River; III, the St. Joe River; IV, the Coeur d'Alene River drainages.

Aside from the general observations, certain restricted areas, were covered intensively, in all cases an attempt was made to locate these blocks, so as to represent as far as possible average conditions. The result of these investigations plus, the general notes form the basis of the following report:

I.

THE BENEWAH

In this particular section of the country, both the mature white pine and the second growth white pine, occur in good stands. From the best available source of information much of the mature white pine will run above 9 M board feet per section. There are also several sections of excellent white pine reproduction, which if given protection will ultimately form a valuable stand of timber. The remainder of the territory is either cut over, burned or slashed and burned.

Black currant growth is heavy along the lower portions of the creek drainages. Prickly currant and sticky currant will run on an average about the same on the entire area. The bushes with the exception of the black currant do not occur in dense masses but occupy the more favorable situations. They will perhaps not average more than 50 to 100 bushes per acre. The black currant growth is for the most part, well concentrated, occurring in general near the mouth of the streams entering the St. Maries River. These bushes will run from small patches of 50 to 100 in some instances to as high as several thousand in others, depending upon the favorableness of the site. Among the brush species found on this area, a very confusing factor arises, in that, Ocean spray greatly resembles the sticky currant and will lead to a great deal of confusion should the area be eradicated.

II.

THE ST. MARIES RIVER DRAINAGE.

Comparative studies show that currants and gooseberries are almost completely absent, from the burns of 1919 and later years. A few scattered bushes were found in the 1919 burn on Tyson Creek. These bushes were of comparatively recent growth. This would seem to indicate that a period of several years is necessary after a severe fire to again allow the area to seed into currants and gooseberries.

Crystal Creek: One of the areas of most abundant growth was found on the St. Maries River. This area has been burned from 1 to 3 times. It is extremely doubtful if this area need be given further consideration, since the possibility of regeneration by other than artificial means are very remote. This area was originally an excellent white pine area. Soil, moisture and site conditions are exceptionally favorable to the growth of white pine. The area is covered by an extremely dense growth of fire weed, fern, ocean spray, and vine maple. This would make eradication prohibitive even if favorable reproduction were present.

Similar conditions are found on the head of the Mica Creek Drainage. This area was in the same logging unit so may be considered as having received the same treatment as the Crystal Creek area.

Sticky currant ranks first in importance on this area. It will run between 100 and 200 bushes per acre. The prickly currant being restricted to the more moist situation will perhaps run between 50 and 150 bushes per acre.

John Creek: Prickly currant is found scatteringly along the stream beds and moist draws. It will not average above 50 to 100 per acre. Sticky currant will average even less than this, and will not run above 30 to 50 bushes per acre. The principal difficulty in this area, in case of an eradication program, would be the density of the brush, some species of which strongly resemble the currants found on this area.

One item aside from the Blister Rust problem, but one which should be of great interest to the lumbermen, is the fact that both the larch and the white pine are suffering heavily from insect attack. The white pine bark beetle is doing considerable damage to isolated trees throughout a larger portion of the drainage. A small green plant aphid was noted generally distributed over the entire John Creek area. This particular pest causes either total or partial defoliation, among the younger trees. (Seedlings to trees of thirty years of age.) Just to what extent this damage may effect the present and future growth of white pine is a problem for the Entomologist to settle. General conclusions on this area will show, that it is almost ideal from the eradication standpoint. In no instance will either the currant or the gooseberry exceed two hundred per acre. For the main part the bushes occur in more or less restricted areas and the control work if carried along the stream and it's tributaries would virtually clear the area except for a few isolated bushes.

Charlie Creek: Prickly currant and white stemmed gooseberry on areas between Emida and Charlie Creek will average 50 to 100 bushes per acre along the creek. After the virgin timber is reached currants and gooseberries of all species are to all intents and purposes negligible . This bears out the observations made thus far that currant and gooseberry conditions within the stand itself are a great deal similar. In virgin timber, with the exceptions of the stream bottoms and natural openings, currants may be said to be non-existent. This is in all probability due to the fact that the dense crown canopy has given such complete shading to the forest floor that the bushes if ever established have since died out. This is born out by the fact that as a stand closes more dead stem is noted on the currant bushes until at complete closure the bushes die out.

St. Maries River, average conditions as found along the side drainages. The mouth of Tyson may be said to be typical of the majority of the streams entering the St. Maries River above the mouth of Santa Creek. A rather complete currant count was made and the following results noted: Black currants 50 per acre, fairly well scattered with no extremely high concentrations. Prickly currants will average 150 per acre, bushes large and confined to fairly dense growth in individual patches. White stemmed gooseberry will run 150 to 200 bushes per acre. It appears to be slightly more scattering than the prickly currant, but was invariably found to be closely associated with it. The white stemmed gooseberry except for the fruit is very easily confused with the prickly currant. The fact that the white stemmed gooseberry is far more susceptible to the disease than is the prickly currant, makes its detection an important phase in the control problem.

Another fact that the season's investigation brought to light, was that almost invariably the black currant, which is the worst offender among the wild varieties, was found more than five hundred feet above the main forks of any side drainage. There are, however, exceptions to this rule. Emerald Creek and the main forks of the St. Maries River due to topographical and soil conditions far exceed this limit, but they are the exception rather than the rule.

Child's Basin: This basin represents a fine body of pine and gives a fair idea of average conditions in this region. This area thru almost complete shading has eliminated whatever currant and gooseberry bushes that were originally on the ground. A few scattered bushes of prickly currant were noted in natural openings along the stream. These almost without exception occurred on over-turned stumps and logs, which would lead the observer to believe that the seeds had been carried there by birds or squirrels. In general, the situation may be summed up in a similar manner as in other virgin stands, control measures need only be applied to the stream beds and adjacent area.

Middle Fork of the St. Maries River: Conditions of currants and gooseberries: (Sec's. 33,34,35,27,26, T.42 N., R.2 E., B.M.) Black currants are abundant, averaging 300 to 500 per acre along the streams. Black currants were noted as far as the south line of Section 26, and it is not known definitely if they are found above that point or not. The side drainages of the middle fork show heavy black currant growth but these do not in any instance exceed the 500 ft. maximum.

The heavy brush factors, alder and fern combined with semi-swamp conditions make this area a difficult one from an eradication standpoint. This area is unquestionably one of the most difficult encountered on the entire Association. Under the present system of eradication it would be entirely impossible to consider this particular locality with a view of removing these bushes. Prickly currant is found in considerable abundance altho it will not exceed 10 to 50 per acre on a general average.

Once again the virgin white pine proves itself to be almost completely free from currants and gooseberries. In a fourteen mile trip thru this timber only one small currant bush was noted, this combined with a low brush density factor, virtually eliminates this area from further consideration.

Currant Conditions: (Sec. 14, T. 43 N., R.1 E., B. M. adjacent to Jim Spur) A very good idea of average conditions can be gained from the data collected on a one-fourth acre circular plot in one of the older burns along the upper St. Maries River. In this area 194 currant bushes (sticky currant) were recorded. The currant bushes were in general very young but were making rapid growth and threatened to become the predominating brush on this area. The only point wherein this does not truly represent an average is the fact that under similar conditions prickly currant would replace the sticky currant to a greater or less degree. It is plainly self evident on the face of the data collected that unless a burn is restocking heavily to white pine it would be quite beyond the practical limits of the work to expect to eradicate such a burn.

In direct comparison to this area is the reproduction stand, located in the vicinity of Katz Spur (Sec. 19, T. 42 N., R. 2 E., B.M.) This stand represents an excellent growth of white pine associated with larch, white fir and lodge pole pine. Percentages will run roughly in the order named, the white pine taking the lead more on account of its extremely rapid growth than by the actual number of trees existing on this area. The age of this stand is roughly between 30 and 40 years. On this area forty bushes of prickly currant were found. These occur only in small groups in natural openings and along fallen trees and over turned stumps. Most of the bushes were very old and in almost every case the number of feet of dead stem found equaled or exceeded the amount of live stem now remaining. This would seem to indicate that as the stand grows older and

the crown canopy becomes more complete the bushes tho long established will gradually disappear. A very small percentage of the currant bushes found on this area were of recent origin and the total number will not exceed 150 bushes per acre, all species concerned. Further observation in the same locality bears out the general idea that the bushes will shade out if the stand is dense and uniform.

Currant conditions as found at high altitudes where there is an appreciable thinning out of the reproduction show an increased tendency towards heavier growth. Observations conducted along the old Bear Trap Trail show that there is an increased growth of prickly currant towards the heads of the draws and still higher up sticky currant replaces it. The bushes in this locality will probably run on an average of 100 per acre at the lower elevations to as high as 300 per acre along the tops of the ridges.

Upper Drainages of the St. Maries River: Black currant conditions. The extremely rank growth found on the more favorable growing places of the wild black currant is best shown by the results obtained on a sample plot on the south fork of the St. Maries River. The bushes are computed on the basis of an acre and the results as tabulated are a fair indicator of what is to be expected under similar conditions.

1. Wild black currant 14,170 per acre.
2. Prickly currant 1,526 per acre.

Total for both species 15,696 per acre. This of course must not be construed to mean that wherever black currant growth is found such conditions of rank growth will exist. This however is well representative of the dense currant matts which are characteristic of the upper portion of the St. Maries River.

Emerald Creek: Further investigation was carried on in the mature white pine stand on the West fork of Emerald Creek. These observations in a large measure seem to bear out the general idea that the eradication program in virgin timber really simmers down to the removal of the bushes along the stream bed. The only bushes noted on this area, that is within the boundaries of the matured stand were in small open spaces where optimum, light and moisture conditions prevailed.

Wild black currant was noted well beyond the 500 ft. maximum which usually marks their limits in side drainages. Emerald Creek may be said to be an exception in that the stream gradient is so slight that soil and moisture conditions do not change appreciably for a considerable distance. This stream and the fork of the St. Maries River already referred to were the only exceptions noted on the entire Association. The bushes along the stream do not show a high concentration but are extremely scattering and will not exceed on an average, 50 to 75 bushes per acre from the mouth of Emerald Creek to their upper limits of growth.

Prickly currant is much more numerous on the lower west fork than is the wild black currant. The majority of these bushes are very old and show that they have been established for a long period of years. Similar conditions are found along the east fork of Emerald Creek, and on both forks the wild black currant was found to reach more than one half mile up either fork.

Further data on burned over areas was obtained in an old burn on Sunset Peak, results may be tabulated as follows:

On a one-fourth acre circular plot prickly currant totaled 112 per acre. The majority of the bushes were young altho there were many older bushes on the area. Sticky currant, due to the elevation and drier site conditions, greatly exceeded the number of bushes of prickly currant found. The total number was 392 per acre. The same general growth was found in this currant as was found in the prickly currant , the larger majority of the bushes being comparatively young and the next heaviest growth was in the extremely old age class.

St. Maries River between Fernwood and Clarkia, Idaho: General observations of currant and gooseberry conditions. Wild black currant occurs scatteringly along the river bank, the bushes running from 10 to 50 per acre. The majority of them are old and have been long established. Prickly currant appears more promising. It will average 50 to 100 per acre and in this case also the bushes fall in the older age classes. These conditions may be said to hold good for one to three chains on each side of the river, varying with the distance to the more abrupt slopes.

Conditions in an old cutting near Metropolitan Spur were tabulated as follows:

Wild black currant and sticky currant will average from 50 to 100 per acre. On this particular area wild black currant was noted growing on a comparatively dry situation. This was the only portion of the Association where a black currant was found other than in swampy or semi-swampy conditions.

North fork of the St. Maries River: Currant conditions along the north fork of the St. Maries River to the Mouth of the Merry Creek and for a short distance up the Merry Creek drainage. (Sec. 5, 6, 8, T.42 N., R.2 E., B.M.) Along the main stream wild black currant and the prickly currant were found. The number of bushes were approximately the same as found on the middle fork. Prickly currant would perhaps not run as heavily in the adjacent stands of timber and will not exceed 10 to 50 bushes per acre.

Wild black currant was found for a considerable distance up the side drainage of Merry Creek. It undoubtedly extends for a considerable distance above the point of observation, which was about one half mile. The bushes will average 500 per acre, along the portion covered. There is little hope for this area unless chemical eradication can be developed to handle this case. The surrounding white pine could not possibly bear the cost of eradication under the present system. Further observation shows that at greater distances into the timber there is a marked thinning out of currant growth. Sticky currant and prickly currant are present in about an equal number and will run 10 to 20 per acre.

Cedar Creek: General observations. Prickly currant is very scattered averaging 10 to 50 per acre. No wild black currants were noted. Further up on this drainage 12 large bushes of wild black currant were noted. Between Cedar Creek and Emerald Creek there was a marked increase in both the wild black currant and prickly currant growth. There was no apparent reason for this increase as soil, moisture and shade conditions remained very nearly constant. The following results show that prickly currant will run 50 to 100 per acre, wild black currant 50 to 100 per acre. Here again we find the wild black currant growing in extremely dense masses under semi-swamp conditions.

Observations along the Clarkia-Bovill road, in an open white pine stand a strip 4 chains long and 1 chain wide was taken. An attempt was made to have this strip represent as far as possible average conditions. On this strip 32 sticky currant bushes, and 5 prickly currant bushes were found. This will run slightly higher than the general average in mature white pine stands. The reason for this is that the stand was much more open than those ordinarily found. This would give the currant and gooseberries more than ordinary growth conditions.

Bectels Butte: Condition in an old burn. In this burn which must have occurred between 10 and 15 years ago no currant or gooseberry bushes were found. The only place that bushes were noted was on areas immediately adjacent to the stream bank. Two small matts of wild black currants were found and a few bushes of prickly currant, not to exceed 15 or 20 in all.

III.

ST. JOE RIVER DRAINAGE.

The 1910 burn in northern Idaho is extremely hard to classify, due to the diversified conditions and the vast area of this burn. The data collected represents average conditions on the more completely devastated areas. The bulk of the burn may to all practical purpose be considered as waste land. It is a problem not of protection, but of reforestation and enters into the problem of blister rust, only in so far as it affects the adjacent white pine area. Currant conditions in this burn vary widely from almost total absence to 300 or more bushes per acre. White pine is almost without exception lacking in sufficient quantities to justify control measures.

Rochat Creek: The area included in the Rochat Creek drainage may be considered as representing a fair average of conditions in general. Along the stream bed, prickly currant was found more or less scattered, 50 to 100 bushes per acre. The majority of the bushes were very young and appeared to have come in since the 1910 fire. Sticky currant appears prominently thruout the area, ranging from the creek bottom to the tops of the secondary ridges. Many of these bushes judging by their size must have escaped the 1910 fire or else they have shown almost unprecedented growth. These bushes will run 250 to 300 per acre.

Marble Creek burned over area: The Marble Creek area is greatly similar to the 1910 burn on the upper St. Joe River. Reproduction areas are only found in small spots that by chance have escaped the repeated fires of the last few years. In a great many instances the burn is too recent to draw any conclusions as to what its status will be in years to come. The major portion of this area may however be considered as a part of the great American desert. There is little hope of satisfactorily restocking by other than artificial means.

Currant conditions in Marble Creek, in the vicinity of the Rutledge Timber Camp No. 7. Very heavy sticky currant growth was noted in this burn. The bushes will run 150 to 200 per acre. Prickly currant appears somewhat less abundant, 100 to 150 bushes per acre. On a similar area including a portion of Eagle Creek and Davaggio Creek the currant conditions change somewhat. Sticky currant almost totally replaces the prickly currant except for the more moist situation adjacent to the streams themselves.

Sticky currant 100 to 150 per acre.
Prickly currant 50 to 75 per acre.

Taking all things into consideration the more severe burns regardless of their age, may be almost completely eliminated from a Blister Rust program under existing economic conditions. They will, however, prove to be a decided factor where their boundaries extend to valuable white pine timber. In practically all of the old burns currants and gooseberries have taken advantage of the increased light and in some cases of the moisture conditions, and as a result their growth has been extremely heavy.

Observations on Upper Trout Creek. The larger portion of this area is included within the boundaries of a burn that appears to be about 15 years old. The currant varieties found here are the same as those in the 1910 burn on Rochat Creek, as there is little if any reproduction present on the area. Sticky currant will run about 100 per acre and prickly currant 50 to 75 per acre.

The virgin timber on Trout Creek is practically free from currants. This combined with the fact that white pine in general does not appear until well beyond the 900 ft. limit along the main drainages and side drainages, affords almost natural protection.

The white pine beetle and the white pine butterfly have taken an exceptionally heavy toll on this drainage. In several instances patches of virgin timber, several acres in extent, were found to have been completely destroyed. The infestation seems to be spreading slowly from these areas and is taking an isolated tree here and there. Should a favorable year come about, this entire area of white pine might be virtually destroyed, as the beetle is well established.

IV.

THE COEUR D'ALENE RIVER AND ITS TRIBUTARIES.

Data on the following sections (Sec. 4,5,8,9, T. 51 N., R.1 E.,B.M.) Prickly currant will run 50 to 100 per acre with the age classes well distributed. Prickly currant occurs in the draws and in the more moist and open situations. It will run 10 to 30 bushes per acre.

A check on the currant conditions in the 1910 burn on the Coeur d'Alene River shows that along the streams prickly currant will run 50 to 100 per acre, white stemmed gooseberry 10 to 50 per acre and sticky currant along the streams and at higher elevations, 50 to 150 per acre.

Independence Creek, (Sec.23,24,26 T.53N., R.2 E.) Prickly currant is extremely heavy along the creek. In this particular locality they will run 800 to 1500 bushes per acre. All timber of commercial value lies in a belt adjacent to the creek. The greatest distance on either side of the drainage where good commercial timber is still found will not exceed 20 chains. In order to protect this area, currants would have to be removed from slightly over one-half the distance thru the timber in question. This timber includes one of the heaviest areas of currant growth found on the Coeur d'Alene River. The cost of removal of these bushes would in all probabilities exceed the stumpage value of the white pine. Currants within the main stand itself are practically negligible, the entire problem centering on the heavy concentration along the main drainage.

Lower Independence and Emerson Creeks: General observations. In this area there is little if any white pine, the main stand consisting of red fir, larch and white fir. Currants and gooseberries will run slightly heavier than average. This is accounted for by the fact that the character of this stand is more or less open.

Yellow Dog Creek: General notes. Prickly currant is the only species found on the area. They will average 50 to 100 per acre. The white pine is the finest immature stand found on the Coeur d'Alene drainage. It is between 50 and 80 years old.

Downey Creek: This drainage contains a stand exactly like that found on the Yellow Dog Drainage. Again the only species of currant encountered is the prickly variety, which will run 50 to 100 per acre.

Coeur d'Alene River in the locality of Enaville: The greater majority of the territory immediately surrounding the town of Enaville may be omitted from consideration. There is very little white pine and such as there is, is of poor growth and it is not probable that it will ever have any commercial importance.

Little North Fork of the Coeur d'Alene River: Almost the entire drainage is the white pine type or contains sufficient white pine to justify considerable additional study. Due to lack of time this area could not be given a thorough study and consequently the notes here are more or less sketchy. Currants and gooseberries in general will not exceed 100 to 150 per acre, and over a larger portion of the territory they will not exceed 50 to 75 per acre.

Honeysuckle Ranger Station to Cascade Creek: Excellent stand of young white pine, a large amount of the reproduction 8 to 10 years old. Currants and gooseberries 50 to 100 bushes per acre.

South Fork of Coeur d'Alene River: White pine very badly scattered, currant growth very much heavier. Prickly currant 50 to 100 per acre. Sticky currant 50 to 75 per acre.

SUMMARY

In summing up the situation as a whole, in mature stands wherein the white pine is present in sufficient amounts to be of commercial importance, very few currants and gooseberries are found. Control measures under such conditions, would be confined to the area immediately adjacent to the stream. Mature stands which are within the boundaries of the older burns and have such burns as their limits will call for eradication along the edge of the burn.

In the case of the burned over areas themselves it is impossible to give more than a tentative idea. They may come back or they may not, depending on the treatment that they receive. Burns of recent date (1919 and later) do not show indications one way or the other and must be left to the future for classification. In the older areas the burn is either restocking or has become a permanent waste. If it is restocking satisfactorily, currant conditions are generally such as to warrant a detailed investigation and in the majority of the cases local control.

The devastated areas automatically classify themselves. They are non-producers and the only way that they have any bearing, is on the adjacent pine stands. In the majority of the cases noted they contain the greatest number of currant bushes per acre and will increase the cost of protection where ever they come in contact with good white pine timber.

Reproduction areas show similar tendencies to those of virgin stands. Where growth is good and the stand is comparatively dense and uniform, currants and gooseberries are only found in the more favorable growing conditions. Such areas in view of their future yield will certainly bear the cost of protection.

Reproduction area, where white pine is scattered or where the stand is patchy cannot be considered because the ultimate profits are not large enough to justify the initial expense of removing a large number of bushes from such territory.

If the work is worth doing it is worth further investigation. Either it is a problem that must be taken seriously and backed as such, or eliminated entirely.

There is no doubt as to the damage caused by white pine blister rust and its appearance in northern Idaho is a certainty within a short period of years. If the disease is to be combated successfully, there must be on hand complete and accurate information, otherwise time and money will be wasted on unprofitable areas.

PROJECT 4
FIELD STUDIES AND COLLECTION OF FIELD DATA

At the present stage of western blister rust work, this projec t covers all work on the spread of the rust, infection and damage to pine, and the compilation and presentation to the public of all information on such matters.

(4.1) Progressive Spread of Rust

Scouting to determine the progressive spread of the rust was carried on in conjunction with the cultivated black currant eradication. The fact was recognized that the best opportunity of finding the rust, if present in a community was afforded by a thorough inspection of all cultivated black currants as found. The cultivated black currant eradication work was therefore planned to permit and require careful inspection of these plants, and working plans were so arranged that such work was carried on in regions where the rust was most to be expected at times late in the working season. Also, numerous native Ribes were carefully inspected during the latter part of the season. No evidence of the rust was found in Montana, Idaho, eastern Washington, Oregon or California.

During October, 1924, a special crew of 4 men was put into western Washington, to determine the progress of the rust in that region. This scouting was conducted in 11 southwestern counties. Infection was found in 5 of these counties, at 25 points. The following table gives the results of this work.

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TABLE XLIX
Scouting in Western Washington

County	Total No. of inspection points	No. of inspection pts. where infection was found	R. nigrum Inf	R. nigrum Not Inf	R. vulgare Inf	R. vulgare Not Inf.	G. reclinata Inf.	G. reclinata Not Inf.	R. bracteosum Inf.	R. bracteosum Not Inf.	R. sanguineum Inf.	R. sanguineum Not Inf.	G. divaricata Inf	G. divaricata Not Inf.	G. lobbii Inf	G. lobbii Not Inf	R. lacustre Inf	R. lacustre Not Inf.	Total Inf	Total Not Inf.
Clarke	4	0	--	1	--	6	--	6	--	6	--	6	--	--	--	--	--	--	--	25
Cowlitz	15	0	--	7	--	24	--	11	--	55	--	3	--	10	--	--	--	--	--	110
Lewis	11	0	--	--	--	28	--	3	--	36	--	3	--	--	--	--	--	--	--	70
Pacific	16	0	--	32	--	8	--	8	--	56	--	--	--	23	--	--	--	--	--	127
Thurston	18	1	--	21	--	--	--	--	10	133	--	8	--	31	--	5	--	--	10	198
Grays Harbor	35	1	--	44	--	--	--	--	1	250	--	--	--	--	--	--	--	--	1	294
Mason	31	1	--	--	--	--	--	--	1	750	--	6	--	11	--	--	--	10	1	777
Pierce	9	0	--	275	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	318
King	2	0	--	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10
Kitsap	27	13	68	41	1	7	--	--	7	234	--	--	--	12	--	--	--	32	76	326
Jefferson	20	9	--	--	--	--	--	--	65	349	--	--	1	--	--	--	--	5	66	354
Total	188	25	68	431	1	73	--	28	84	1912	--	26	1	87	--	5	--	47	154	2609

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Clarke	4	0	--	1	--	6	--	6	--	6	--	6	--	--	--	--	--	--	--	25
Cowlitz	15	0	--	7	--	24	--	11	--	55	--	3	--	10	--	--	--	--	--	110
Lewis	11	0	--	--	--	28	--	3	--	36	--	3	--	--	--	--	--	--	--	70
Pacific	16	0	--	32	--	8	--	8	--	56	--	--	--	23	--	--	--	--	--	127
Thurston	18	1	--	21	--	--	--	--	10	133	--	8	--	31	--	5	--	--	10	198
Grays Harbor	35	1	--	44	--	--	--	--	1	250	--	--	--	--	--	--	--	--	1	294
Mason	31	1	--	--	--	--	--	--	1	150	--	6	--	11	--	--	--	10	1	177
Pierce	9	0	--	275	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	318
King	2	0	--	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10
Kitsap	27	13	68	41	1	7	--	--	7	234	--	--	--	12	--	--	--	32	76	326
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Total	188	25	68	431	1	73	--	28	84	1912	--	26	1	87	--	5	--	47	154	2609

The results of the scouting in Okanogan County are given in the following table.

TABLE L

Species of Ribes	No. of Inspection Points	Total No. of Plants Inspected	Infections
R. nigrum	30	434	0
R. petiolare	13	369	0
R. lacustre	6	152	0
R. viscosissimum	2	11	0
R. cereum	8	107	0
R. vulgare	5	39	0
G. inermis	9	273	0
G. reclinata	3	65	0
Total	76	1450	0

(4.2) Damage to Pine

Progress Report
Control Demonstration Area
Cheekye, B.C.

During the spring of 1923 a Control Demonstration Plot was established at Cheekye, B.C. It had for its purpose the determination of distance of spread of blister rust from Ribes to white pine under western conditions.

This report covers the progress made in the work in 1924. A detailed discussion of what was accomplished in 1923 is given on page 4 of the Annual Report of the Spokane Branch Office of Blister Rust Control. It will only be necessary to give here a brief statement of the work done previous to 1924, which may be considered as 4 phases as follows:

1. Surveying Area: In late April, 1923 a plot circular in outline, having a radius of 1250 feet, was surveyed. The area had been cut and burned over possibly 15 or 20 years previous. Ribes species and Pinus monticola, seedlings and poles, were abundant. There was a heavy and well distributed infection of blister rust.

TABLE XLIV
Scouting in Western Washington

County	Total No. of inspection points	No. of inspection pts. where infection was found	R. nigrum Inf.	R. nigrum Not Inf.	R. vulgare Inf.	R. vulgare Not Inf.	G. reclinata Inf.	G. reclinata Not Inf.	R. bracteosum Inf.	R. bracteosum Not Inf.	R. sanguineum Inf.	R. sanguineum Not Inf.	G. divaricata Inf.	G. divaricata Not Inf.	G. lobbii Inf.	G. lobbii Not Inf.	R. lacustre Inf.	R. lacustre Not Inf.	Total Inf.	Total Not Inf.
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Lewis	11	0	--	--	--	28	--	3	--	36	--	3	--	--	--	--	--	--	--	70
Pacific	16	0	--	32	--	8	--	8	--	56	--	--	--	23	--	--	--	--	--	127
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G. reclinata	3	65	0
Total	76	1450	0

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1. Surveying Area: In late April, 1923 a plot circular in outline, having a radius of 1250 feet, was surveyed. The area had been cut and burned over possibly 15 or 20 years previous. Ribes species and Pinus monticola, seedlings and poles, were abundant. There was a heavy and well distributed infection of blister rust.

The results of the scouting in Okanogan County are given in the following table.

TABLE L

Species of Ribes	No. of Inspection Points	Total No. of Plants Inspected	Infections
R. nigrum	30	474	0
R. petiolare	13	359	0
R. lacustre	6	152	0
R. viscosissimum	2	11	0
R. cereum	8	107	0
R. vulgare	5	39	0
G. inermis	9	273	0
G. reclinata	3	35	0
Total	76	1450	0

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2. Eradication of Ribes: The Ribes were eradicated by crews of men, each consisting of five men in line spaced 5 or 6 feet apart, and a foreman and checker back of the line. The Plot was covered three times in this manner. Table 53 shows the results.

3. White Pine Planting: Two year P. monticola transplants from Wind River Forest Service Experiment Station were planted on eight radii, three rows to a radius. The distance between rows, and the spacing between pines in each row, was six feet. The planting was done on May 10, 1923, when planting conditions were exceptionally good. Considerable moisture fell thruout the growing season. It is shown in Table 57 that nearly 88% of the pines were alive in May, 1924.

4. Patroll~~ery~~ing for Fire: During the summer of 1923 one man was employed to patrol the area for fire, and to work on the plot in spare time, cleaning out around pines, etc.

Work Done in 1924

The study was continued along the general lines enumerated above and will be discussed according to the following headings:

1. Inspection of plot for Ribes missed in 1923.
2. Replacement of planted pines which had died.
3. Patrol of area for fire.
4. Inspection of planted pines for evidence of blister rust.
5. Analysis of infection of native pines on the plot.
6. Topographic survey of Cheekye region.

1. Inspection of Plot for Ribes Missed in 1923.

In May, 1924 the plot was rechecked for Ribes missed in 1923. A crew of 3 or 4 men in line, spaced 8 to 10 feet apart went back and forth over the area by octants in a direction parallel to the circumference. This method was used in order to approach missed Ribes by a different direction from that taken in 1923. Tables 51 to 56 and Map of Cheekye show what was found.

2. Eradication of Ribes: The Ribes were eradicated by crews of men, each consisting of five men in line spaced 5 or 6 feet apart, and a foreman and checker back of the line. The Plot was covered three times in this manner. Table 53 shows the results.

3. White Pine Planting: Two year P. monticola transplants from Wind River Forest Service Experiment Station were planted on eight radii, three rows to a radius. The distance between rows, and the spacing between pines in each row, was six feet. The planting was done on May 10, 1923, when planting conditions were exceptionally good. Considerable moisture fell thruout the growing season. It is shown in Table 57 that nearly 88% of the pines were alive in May, 1924.

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5. Analysis of infection of native pines on the plot.

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1. Inspection of Plot for Ribes
Missed in 1923.

In May, 1924 the plot was rechecked for Ribes missed in 1923. A crew of 3 or 4 men in line, spaced 8 to 10 feet apart went back and forth over the area by octants in a direction parallel to the circumference. This method was used in order to approach missed Ribes by a different direction from that taken in 1923. Tables 51 to 56 and Map of Cheekye show what was found.

TABLE LI
Ribes Found Cheekye Plot
1924

Oct-ant.	Species	Date	Location	Size on Date Found Rt.	Size on Date Found L.S.	End of Season's Growth 1923 Ht.	1923 L.S.	1922 Rt.	1922 L.S.	Remarks
N-NE	R.lac.	5/6/24	25 Ft.at rt.angles	1.3	1.3	1.2	1.2	—	—	On rock. Portion of root of bush
			of N.8°E							pulled 1923.
	R.lac.	5/7/24	30 feet at rt.angles	.4	1.5	.3	1.0	.1	.3	Broken off portion of bush pulled in 1923.
			from N 22°E	.3	.6	.2	.3	—	—	On Rocky Hill. These found within 2 feet of
				.1	.1	—	—	—	—	each other. Evidently bush imperfectly
										pulled, 1st eradication, 1923.
	R.lac.	5/7/24	7 feet west of above	.5	.75	.25	.3	—	—	Broken off portion of bush pulled in 1923.
	R.lac.	5/7/24	60 feet at rt.angles	.25	.25	.15	.15	—	—	Seedling) Remains of bush
			from N 20°E	.25	.25	.2	.2	—	—	Seedling) pulled in 1923.
				.5	.5	.4	.4	—	—	Broken root) On Rocks.
	R.lac.	5/7/24	75 feet at rt.angles	.5	.75	.4	.7	.2	.3)	Under pile of pulled bushes. Fell off and
			from N 22°E	.7	.7	.6	.6	0	0)	took root. All new leaves. On Rocks.
	R.lac.	5/7/24	80 feet at rt.angles	1.2	1.7	1.1	1.4	.7	1.0	On Rocks. Missed bush 1923. in hole.
			from N 33°E							
	R.lac.	5/8/24	120 feet rt. angles	.2	.2	.1	.1	—	—	Old piece of root not pulled. Dead branch
			from N 24°E							beyond. 4 small leaves 1/3 inch in diameter
										Growing on rocks, west slope.
	R.sang.	5/8/24	126 feet rt. angles	.3	.3	.2	.2	—	—	Foot of small hill. From broken off stem,
			from N 22°E							1923. Three leaves.
	R.sang.	5/9/24	240 feet rt. angles	.7	.7	.4	.4	.1	.1	Bush missed, 1923. Just south of Lake Alice
			from N 22°E							Trail.
	R.sang.	5/9/24	235 Feet rt. angles	1.0	1.0	.8	.8	—	—	Old root under log, evidently cut with
			from N 21.5°E							mattock. Near trail.
	R.lac.	5/9/24	130 feet NW of Pine	1.5	8.0	1.4	7.5	1.2	6.5	Hidden by Douglas Fir tree four feet tall,
			64 on NE Radius							north of Ribes, and almost covering it.
										Missed bush, 1923.
	R.sang.	Aug.7,24	30 feet rt. angles	1.2	6.0	1.0	5.0	.8	3.5	Missed bush, 1923.
			from N 20°E							
	R.sang.	10/11/24	33 feet rt. angles	.3	.3	.3	.3	—	—	No growth 1924. Growing in open near
			from N 3°E							brush clump. Missed bush.
	R.sang.	10/20/24	100 feet NW of 14¼	.7	.7	?	?	?	?	3 years old. No infection on leaves. Prob-
			Chains on NE Radius							ably overgrown with ferns at time of erad-
										ication. In open space.
NE-E	R.sang.	5/10/24	86 feet SE of Pine	3.5	7.0	3.5	7.0	3.1	6.5	Growing among alder branches. SW side of
			68 NE Radius							tree. Missed, 1923.
	R.sang.	5/10/24	35 feet rt. angles	1.5	1.5	1.5	1.5	1.4	1.4	Growing among vine maples in shade. N.side
			from N 80°E							of tree. Missed bush.
	R.sang.	5/11/24	40 feet rt. angles	4.0	6.0	3.5	5.5	3.0	4.0	Growing with wild cherry tree of same height.
			from N 50°E							Missed bush, 1923.
	R.bract.	5/11/24	140 feet rt. angles	.8	1.0	.75	.9	.6	.75	On mineral soil under upturned stump. Six
			from N 74°E							leaves. Missed bush.
	R. lac.	5/11/24	185 feet SE of 14	.9	2.8	.8	2.5	.6	1.5	North of and under alder in midst of
			chains on NE Radius							castellia. Missed bush.
E-SE	R.sang.	5/13/24	12 feet rt. angles	.7	.7	.4	.4	.2	.2	5 leaves) One find. Missed bushes under
	R.sang.		from S 89°E	.6	.6	.4	.4	.1	.1	5 leaves) log. Probably well screened
	R.sang.			.3	.3	.25	.25	.1	.1	3 leaves) with bracken ferns.
	R.sang.	5/13/24	8 feet rt. angles	.5	.5	.4	.4	.3	.3	Three leaves. Missed bush. Fairly open,
			from S 87°E							near Rubus.
	R.sang.	5/13/24	65 feet S of 16 Pine	.3	1.0	.1	.3	—	—	One find. Growing from
	R.sang.		on E Radius	.6	1.1	.4	.7	—	—	3 small shoots—root left in '23. West
	R.sang.			.2	.2	.1	.1	—	—	bank of ditch.
	R.sang.	5/13/24	85 feet S of 16 Pine	.6	1.2	.4	.8	—	—	Shoots growing from bush apparently dead at
			on E Radius							time of eradication. Screened at base of
										cottonwood. Dead stem 1.6 feet beyond shoot.
										Total dead stem of bush 2.5.
	R.sang.	5/13/24	80 feet rt. angles	.3	.3	.2	.2	—	—	Open. Small shoot growing from root left
			from S 80°E							in 1923.
	R.sang.	5/14/24	310 feet NE of Pine	.5	.5	.4	.4	.2	.2	)One find. Missed in 1923. Open three
	R.sang.		50 on SE Radius	.8	.8	.7	.7	.5	.5	)sides. Partly sheltered by small logs.
	R.sang.			.3	.3	.2	.2	—	—	)Dead bracken surrounding Ribes.
	R.sang.	5/14/24	120 feet S of 15	.4	.4	.3	.3	—	—	Shoot growing from root not pulled in 1923.
			Chains on E Radius							Open.
	R.sang.	5/14/24	210 feet NE of Pine	.2	.2	.1	.1	—	—	Grown since '23.) One find.
	R.sang.		60 on SE Radius	.5	.5	.4	.4	.2	.2	Root not pulled,'23.)Growing under
	R.sang.			.5	.5	.4	.4	.2	.2	Missed, '23.)log and
	R.sang			.5	.5	.5	.4	.2	.2	Missed, '23.)between
	R.sang.			.6	.6	.4	.4	.2	.2	Missed. '23.)log
	R.sang			.3	.3	.2	.2	—	—	Grown from root not pulled,'23.)and
	R.sang.			.5	.5	.3	.3	—	—	Missed.'23. Almost dead.)vine
	R.sang.			.4	.4	.3	.3	—	—	Missed,'23.)maple.
	R.sang.			.2	.2	.1	.1	—	—	Grown from root not pulled,'33.)
	R.sang.			.2	.2	.1	.1	—	—	Grown from root not pulled,'23.)
	R.sang.	5/14/24	175 feet NE of 13	.2	.2	.1	.1	—	—	Grown from root not pulled,'23.)One find.
	R.sang.		Chains on SE Radius	.5	1.0	.4	.8	—	—	" " " " " ")Except for
	R.sang.			.4	.4	.2	.2	—	—	" " " " " ")two seed-
	R.sang.			.3	.6	.2	.4	—	—	" " " " " ")lings these
	R.sang.			.2	.6	.1	.3	—	—	" " " " " ")Ribes are
	R.sang.			.5	1.4	.4	1.0	—	—	" " " " " ")all shoots
	R.sang.			.2	.4	.1	.2	—	—	" " " " " ")from roots
	R.sang.			.8	.8	.6	.6	.3	.3	Missed '23. Heavily screened)remaining
										under log. Two leaves)in ground
	R.sang.			.5	.5	.4	.4	.2	.2	Missed '23. Heavily screened)when bush
										under log.)was pulled
	R.sang.			.2	.2	.1	.1	—	—	Grown from root not pulled,'23.)in '23.
	R.sang.			.3	.3	.2	.2	—	—	" " " " " ")Along 2 logs.
	R.sang.	5/14/24	210 feet NE of 71	.5	1.6	.3	1.0	5 shoots		)One find. Shoots from roots left when
			Pine on SE Radius					growing up		)bush was pulled in 1923.
	R.sang.			.3	.3	.2	.2	—	—	)Behind small log.
	R.sang.	5/14/24	235 feet NE of 72	.3	.3	.1	.1	—	—	5 leaves. Missed 1923. Slightly screened
			Pine on SE Radius							by log. Heavily screened by growth of
										bracken fern.
	R.sang	5/14/24	245 feet NE of 72	.5	1.5	.3	.9	—	—	3 shoots from root not pulled 1923.
			Pine on SE Radius							Broken off above ground. Open.
	R.sang.	5/15/24	30 feet NE of 116	1.0	1.9	.9	1.7	.7	1.2	Missed bush 1½ feet east of balm of gilead.
			Pine on SE Radius							Unhealthy bush.
	R.lac.	5/15/24	10 feet NE of 175	1.0	1.7	.9	1.5	.7	1.0	Missed bush. Growing low on ground among
			Pine on SE Radius							Oregon grapes.
SE-S	R.sang.	5/16/24	90 feet E of 13	.4	.4	.5	.3	.1	.1	Missed bush growing under small log in grass.
			Chains on S Radius							Unhealthy bush. Six leaves.
S-SW	R.sang	5/22/24	396 feet west of 15	4.3	11.0	4.2	10.0	.3	6.0	Missed bushes. Between two willows 8 feet
			Chains on S Radius	2.5	2.8	2.4	2.4	1.4	1.4	tall. Open on S side. Visible from NE and
										S. No reason for missing, 1923. Large
										lacustre pulled near here, 1923.
SW-W	R.lac	5/21/24	75 feet rt. angles	1.4	6.0	—	—	—	—	)Remains of old bush pulled 1923. Evidently
			from S 84°W	1.5	2.0	—	—	—	—	)fallen on ground and taken root from
				.7	1.2	—	—	—	—	)stems. Near log. Four leaves
				.5	.7	—	—	—	—	)infected showing uredinia --
				.2	.2	—	—	—	—	)no telia.
	R.sang	5/21/24	275 feet S of 62	1.3	2.0	1.1	1.5	.8	.9	Missed bush growing under small hemlock and
			Pine on W Radius.							in blackberry bushes.
	R.sang.	5/3/24	30 ft. NW of 6.5	.5	1.0	.4	.9	.2	.3	Missed bush, 1923. Growing in open
			Chains on SW Radius							
W-NW	R.sang	5/20/24	200 feet N of 76	.5	1.0	—	—	—	—	Remains of old bush pulled '23.)One location
			Pine on W Radius							Portion of buried stem)Remains of
	"			.3	.3	.2	.2	—	—	New"Bush"missed 1923.)old bush
	"			.3	.3	.05	.05	—	—	Portion of buried stem.)pulled 1923
	"			.4	.8	—	—	—	—	" " " ")and starting
	"			.3	.8	—	—	—	—	" " " ")up again from
	"			.3	.3	.1	.1	—	—	New"bush"missed 1923.)stems left or
	"			.3	.3	.1	.1	—	—	" " " ")fallen on
				.4	.9	—	—	—	—	Portion of buried stem.)ground. Some
										)new seedlings
										)as listed. in
										blackberry bushes
	R.sang.	5/21/24	60 feet N of Pine	.6	.6	.3	.3	.2	.2	5 leaves showing. Missed bush 1923. Under
			115 W Radius							birch in blackberry vines.

In order to properly analyze the data in Table 51 from different view points, it is necessary to construct several tables based on Table 51. Tables 52, 53, 54, 55, 56 are derived chiefly from Table 51.

Certain points may be observed from Table 51.

1. The largest Ribes found was a R. sanguineum located in the S-SW octant, 4.3 feet tall with 11 feet of live stem. If any reason can be given for the fact that this bush was overlooked on three successive occasions by the eradication crews in 1923, it is that it was located between two willows 8 feet tall, and that the foliage of the two species intermingled to a slight degree.

2. The smallest Ribes found was a R. lacustre, .1 foot tall, sprout growing from a root left from a bush imperfectly pulled in 1923. This was located near the circumference in the N-NE octant.

Table 52 gives a total of the Ribes found in 1924 by octants:

TABLE LII
Total Ribes Found, 1924 , by Octants.

Octant	Ribes Species	Number Locations	Number Bushes	Total Feet Live Stem	Average No. Bushes per Location	Average Ft. Live Stem per bush
N-NE	R.sang.	6	6	9.0	1.0	1.5
	R.lac.	8	13	16.6	1.6	1.3
	Total	14	19	25.6	1.4	1.35
NE-E	R.sang.	3	3	14.5	1.0	4.8
	R.bract.	1	1	1.0	1.0	1.0
	R.lac.	1	1	2.8	1.0	2.8
	Total	5	5	18.3	1.0	3.65
E-SE	R.sang.	13	39	23.8	3.0	.6
	R.lac.	1	1	1.7	1.0	1.7
	Total	14	40	25.5	2.9	.65
SE-S	R.sang.	1	1	.4	1.0	.4
S-SW	R.sang.	1	2	13.8	2.0	6.9
SW-W	R.sang.	2	2	3.0	1.0	1.5
	R.lac.	1	5	10.1	5.0	2.05
	Total	3	7	13.1	2.3	1.9
W-NW	R.sang.	2	9	5.3	4.5	.6
NW-N	None	None	None	None	None	None
Total	R.sang.	28	62	69.8	2.2	1.13
	R.lac.	11	20	31.2	1.8	1.56
Area	R.bract.	1	1	1.0	1.0	1.0
Grand Total		40	83	102.0	2.1	1.23

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	R.lac.	8	13	16.6	1.6	1.3
	Total	14	19	25.6	1.4	1.35
NE-E	R.sang.	3	3	14.5	1.0	4.8
	R.bract.	1	1	1.0	1.0	1.0
	R.lec.	1	1	2.8	1.0	2.8
	Total	5	5	18.3	1.0	3.65
E-SE	R.sang.	13	39	23.8	3.0	.6
	R.lec.	1	1	1.7	1.0	1.7
	Total	14	40	25.5	2.9	.65
SE-S	R.sang.	1	1	.4	1.0	.4
S-SW	R.sang.	1	2	13.8	2.0	6.9
SW-W	R.sang.	2	2	3.0	1.0	1.5
	R.lec.	1	5	10.1	5.0	2.05
	Total	3	7	13.1	2.3	1.9
W-NW	R.sang.	2	9	5.3	4.5	.6
NW-N	None	None	None	None	None	None
Total	R.sang.	28	62	69.8	2.2	1.13
	R.lec.	11	20	31.2	1.8	1.56
Area	R.bract.	1	1	1.0	1.0	1.0
Grand	Total	40	83	102.0	2.1	1.23

An examination of Table 52 shows the following conditions:

1. By far the greater number of Ribes found in 1924 occurred in the eastern half of the area. 85% of the total Ribes locations; 78% of the total Ribes bushes; and 68% of the total live stem was found in the eastern half.

2. The average size of bushes found on the west half, 1.8 feet of live stem, was much larger than the average size of bushes found on the east half, 1.07 feet of live stem.

3. The largest number of Ribes bushes occurred in the E-SE octant. Nearly half of the total number of Ribes bushes were found on 12.5% of the area. However, these were small bushes, averaging less than .67 feet of live stem. The total live stem on this octant was practically the same as that on the N-NE octant, with less than half the number of Ribes bushes.

Table 53 shows the number of bushes and feet of live stem of Ribes found in 1923 and 1924.

TABLE LIII
Comparison of Ribes Found 1923 and 1924 by Quadrants

Quadrant	Ribes Found 1923: No.	Feet of live stem	Ft. live stem per bush	Ribes Found 1924: No.	Feet of live stem	Ft. live stem per bush	Percent of Efficiency: By number	By Feet of live stem
N.E.	1484	17294.2	11.65	24	43.9	1.83	98.41	99.75
S.E.	1857	13045.0	7.03	41	25.9	.63	97.84	99.81
S.W.	640	10349.1	16.17	9	26.9	2.98	98.61	99.74
N.W.	803	7324.4	9.12	9	5.3	.59	98.89	99.93
Total	4784	48012.7	10.03	83	102.0	1.23	98.29	99.79

An examination of Table 53 shows the following conditions:

1. the percent of efficiency is not strictly a true statement of efficiency. The comparison is made between Ribes found in 1923 and 1924, and not as they were in 1923. Included in the Ribes found in 1924 are several seedlings which came up since the spring of 1923. The feet of live stem of all bushes found in 1924 were considered as they actually existed in 1924, and were not discounted back to the 1923 basis. This fact would tend to raise somewhat, the percent of efficiency.

2. Owing to the small size of Ribes found in 1924, the percent of efficiency is approximately 1½ % higher by feet of live stem than by number of Ribes.

3. There is a direct relationship between the number, and feet of live stem of Ribes found in 1923 and 1924. In each year the number of Ribes found was greatest in the S.E. Quadrant; next greatest in the

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Total	4784	48012.7	10.03	83	102.0	1.23	98.29	99.79

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2. Owing to the small size of Ribes found in 1924, the percent of efficiency is approximately 1½% higher by feet of live stem than by number of Ribes.

3. There is a direct relationship between the number, and feet of live stem of Ribes found in 1923 and 1924. In each year the number of Ribes found was greatest in the S.E. Quadrant; next greatest in the

N.E. Quadrant; next largest in the S.E. and S. W. Quadrants; and least in the N.W. Quadrant. The average size of Ribes found each year was largest in the S. W. Quadrrant, next largest in the N.E. Quadrant; and smallest in the other two Quadrants.

TABLE LIV

Comparison of Eradication in 1923 and 1924 by Ribes species.

Ribes Species	Ribes Found '23: Number	Ribes Found '23: Feet of Live Stem	Ribes Found '24: Number	Ribes Found '24: Feet of Live Stem	Percent of Efficiency, 1923: By Number	Percent of Efficiency, 1923: By Feet of Live Stem
R. sang.	4187	40240.4	62	69.8	98.54	99.82
R. lac.	555	7517.8	20	31.2	96.52	99.59
G. divac.	35	243.0	---	----	100.	100.00
R. Bract.	11	11.5	1	1.0	91.67	92.00
Total Ribes	*4788	48012.7	83	102.0	98.30	99.79

*It may be noted that the total of Ribes found in 1923 by species is 4 bushes more than the total by Quadrants in Table 53. This is the results of an error in the 1923 Report. It is thought that 4788 is the correct total.

The following points may be observed from an examination of Table 54:

1. No G. divaricata was found in 1924. G. divaricata grows erect. The leaves are close to the stem and give the impression of growing in bunches. The plant is quite distinct from other deciduous growth.

2. The next highest % of efficiency was found in searching for R. sanguineum. The leaves of this Ribes are darker green in color than other deciduous growth resembling it. R. sanguineum grows upright.

3. The third highest efficiency securred in searching for R. lacustre. This Ribes has a tendency to creep along the ground, and spread by "layering". It was difficult for this reason to be sure that the whole plant was destroyed. Also, R. lacustre leaves resemble in color and texture the leaves of Acer circinatum, the vine maple.

4. The lowest percent of efficiency occurred in searching for R. bracteosum. Altho this percent of efficiency is based on only 12 buches, yet it is believed that the efficiency would be low regardless of the number of bushes, if eradication is done in the spring. R. bracteosum is very tardy in putting out leaves. Consequently it is difficult to see among deciduous growth already well leafed out. In 1923 9 out of the 11 R. bracteosum were found the third time over the area.

N.E. Quadrant; next largest in the S. . and S. . quadrants: and least in the N.W. Quadrant. The average size of Ribes found each year was largest in the S. . Quadrant, next largest in the N.E. Quadrant; and smallest in the other two Quadrants.

TABLE LIV

Comparison of Eradication in 1923 and 1924 by Ribes species.

Ribes Species	Ribes Found '23: Number	Ribes Found '23: Feet of Live Stem	Ribes Found '24: Number	Ribes Found '24: Feet of Live Stem	Percent of Efficiency, 1923: By Number	Percent of Efficiency, 1923: By Feet of Live Stem
R. sang.	4157	40240.4	62	69.8	98.54	99.82
R. lac.	555	7517.8	20	31.2	96.52	99.59
G. divac.	35	243.0	---	----	100.	100.00
R. Bract.	11	11.5	1	1.0	91.67	92.00
Total Ribes	*4758	48012.7	83	102.0	98.30	99.79

*It may be noted that the total of Ribes found in 1923 by species is 4 bushes more than the total by Quadrants in Table 53. This is the results of an error in the 1923 Report. It is thought that 4758 is the correct total.

The following points may be observed from an examination of Table 54:

1. No G. divaricata was found in 1924. G. divaricata grows erect. The leaves are close to the stem and give the impression of growing in bunches. The plant is quite distinct from other deciduous growth.

2. The next highest % of efficiency was found in search for R. sanguineum. The leaves of this Ribes are darker green in color than other deciduous growth resembling it. R. sanguineum grows upright.

3. The third highest efficiency occurred in searching for R. lacustre. This Ribes has a tendency to creep along the ground, and spread by "layering". It was difficult for this reason to be sure that the whole plant was destroyed. Also, R. lacustre leaves resemble in color and texture the leaves of Acer circinatum, the vine maple.

4. The lowest percent of efficiency occurred in searching for R. bracteosum. Altho this percent of efficiency is based on only 11 bushes, yet it is believed that the efficiency would be low regardless of the number of bushes, if eradication is done in the spring. R. bracteosum is very tardy in putting out leaves. Consequently it is difficult to see among deciduous growth already well leafed out. In 1923 9 out of the 11 R. bracteosum were found the third time over the area.

Table 55 gives a comparison of the average sizes of Ribes species found in 1923 and 1924.

TABLE LV

Average Sizes of Ribes Species Found.

Ribes Species	Average F.L.S. Ribes Found in 1923	Average Size bushes found in 1924.		Average size of bushes found 1924 as they were probably at end of 1923 growth.	
		Height (Feet)	Feet of Live Stem	Height (Ft.)	Feet Live Stem
R. sang.	9.61	.73	1.13	.6	.96
R. lac.	13.55	.76	1.56	.47	1.12
G. divac.	6.94	--	--	--	--
R. bract.	1.05	.8	1.0	.75	.9
Total Ribes:	10.03	.74	1.23	.58	1.02

An examination of Table 55 shows the following points:

1. The average feet of live stem of Ribes found in 1923 was nearly 9 times that of Ribes found in 1924.

2. The average size of bushes found in 1924 as they were probably at the <u>end</u> of the 1923 growing season was approximately one tenth the average size of bushes found in 1923.

3. It is probable that the bushes found in 1924, were still smaller at the time of eradication in the spring of 1923.

Table 56 shows the circumstances regarding the finding of each Ribes in 1924.

Table 55 gives a comparison of the average sizes of Ribes species found in 1923 and 1924.

TABLE LV
Average Sizes of Ribes Species Found.

Ribes Species	Average T.L.S. Ribes Found in 1923	Average Size bushes found in 1924. Height (Feet)		Average size of bushes found 1924 as they were probably at end of 1923 growth. Height (ft.)	
		Height (Feet)	Feet of Live Stem	Height (ft.)	Feet Live Stem
L. sang.	9.61	.73	1.13	.6	.95
R. lac.	13.55	.76	1.56	.47	1.12
G. divar.	6.94	—	—	—	—
R. bract.	1.05	.5	1.0	.75	.9
Total Ribes	10.03	.74	1.23	.55	1.02

An examination of Table 55 shows the following points:

1. The average feet of live stem of Ribes found in 1923 was nearly 9 times that of Ribes found in 1924.

2. The average size of bushes found in 1924 as they were probably at the <u>end</u> of the 1923 growing season was approximately one tenth the average size of bushes found in 1923.

3. It is probable that the bushes found in 1924, were still smaller at the time of eradication in the spring of 1923.

Table 56 shows the circumstances regarding the finding of each Ribes in 1924.

TABLE LVI

Classification of Ribes Found 1924 as to Their Existance in 1924.

Ribes Species	Locations: Type	Locations: No.	Number of Bushes: Bush Pulled 1923 Alive 1924	Roots not Pulled 1923	Seed-lings 1924	Seed-lings 1923	Bushes 4 years old and over.	Total
R. sang.	New	18	—	--	--	5	18	23
	Old	10	5	23	2	9	--	39
	Total	28	5	23	2	14	18	62
R. lac.	New	4	--	--	--	--	4	4
	Old	7	7	7	--	2	--	16
	Total	11	7	7	--	2	4	20
R. bract.	New	1	--	--	--	--	1	1
Total Ribes	New	23	--	--	--	5	23	28
	Old	17	12	30	2	11	--	55
		40	12	30	2	16	23	83

Explanation of terms:

The term "Location" is an area not greater than 4 feet in diameter on which Ribes occur.

The term "New" location means that it was not found in 1923.

The term "Old" location means that it was found in 1923, and supported Ribes growth in 1924.

Attention is called to the following points in Table 56:

1. Practically 60% of the total locations where Ribes were found were locations not found in 1923.

2. Only 36% of the R. sanguineum locations were old locations; while 64% of the R. lacustre locations were found in 1923. This fact suggests that R. lacustre is more difficult than R. sanguineum to permanently eradicate.

3. There were 1.2 bushes per new location, and 3.2 bushes per old location.

4. Of the bushes found on the old locations, 76% were grown either from roots left in the ground when the original bush was pulled in 1923, or from a portion of the original bush pulled and fallen on the ground and taken root again.

5. 24% of the bushes found on the old locations were either 1923 or 1924 seedlings. Possibly the exposure and stirring up of the soil caused by the pulling of the original bushes caused the Ribes seeds lying under the bushes to germinate. If such was the case, it is to be expected that there will be other seedlings coming up from bushes pulled in 1923. Particularly is this true of R. sanguineum since 85% of the 1923 and 1924 seedlings growing on old locations were R. sanguineum seedlings.

6. No Ribes four years old and over were found on old locations.

7. 82% of the bushes found on the new locations were four or more years old.

8. 44% of the R. lacustre bushes and 13% of the R. sanguineum bushes found on the old locations came from bushes pulled in 1923, which fell on the ground and grew again, either by layering, or the roots taking root again. This shows the ease with which R. lacustre starts again, and indicates that in order to ensure the complete death of the plant, it must be hung up securely and the dirt well shaken off the roots.

II Replacement of Planted White Pines Which Had Died.

In May, 1924, the missing planted white pines were replaced by white pines of the same age and source, Wind River Forest Service Experiment Station, Carson, Washington. The trees replaced were marked by aluminum tags labelled "1924".

Table 57 shows the number and percent of pines alive at different times.

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TABLE LVII

Number and Percent of Planted White Pines Alive

Radius	Total Pines Planted May 10,1923	Checked Sept.15,'23 No. Alive	Checked Sept.15,'23 % Alive	Checked May, 1924 Before Replanting No. Alive	Checked May, 1924 Before Replanting % Alive	Pines Planted May 1924	Checked Sept.15,'24 Number Alive	Checked Sept.15,'24 Percent Alive
North	624	600	96.15	589	94.31	35	605	96.95
N.E.	621	558	89.86	554	89.21	67	599	96.78
East	622	598	96.14	596	95.82	26	609	97.91
S.E.	634	572	90.22	565	89.12	69	616	97.16
South	564	542	96.13	536	95.04	28	563	99.82
S.W.	538	429	79.74	411	76.39	127	504	93.68
West	562	462	82.21	431	76.69	131	514	91.46
N.W.	598	519	86.79	505	84.45	93	542	90.64
Total	4763	4280	89.86	4187	87.91	576	4552	95.57

Most of the pines missing September 1924, were those planted in May, 1924. The time of planting was very dry, followed by a hot summer.

The man detailed to patrol the area for fire cleared out around each tree to prevent possible shading out by ferns and other growth.

III Patrol of Area for Fire

On May 24, 1924 fire broke out on the holdings of the Cheakamus Lumber Company, about one mile northwest of the plot, on the east side of Squamish River. This was accompanied by a strong south wind. If the wind had been from the north, very probably the plot would have been burned over. This fire spread to rocky, inaccessible hillsides on the east side of Squamish River, and was not reported out until the latter part of August, 1924.

A man was detailed and paid by this office from June 1 to September, to guard the plot from fire. The following instructions were issued him:

"Fire patrol: patrol area for fire with shovel, Cheekye to Lake Alice; Lake Alice, Brackendale trail; road, Brackendale to Cheekye, every hot, dry day, and particularly on Saturday, Sunday, and Monday. Keep sharp lookout for small fires starting from matches or cigarettes. If possible, get name of offender and report same to Fire Warden MacKay, at Brackendale.

"Meet and get acquainted with District Ranger Sweetman, at Squamish. Learn all you can concerning methods of fire fighting from MacKay and Sweetman. Sweetman will supply you with badge and authority.

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Number and Percent of Planted White Pines Alive

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"Meet and get acquainted with District Ranger Sweetman, at Squamish. Learn all you can concerning methods of fire fighting from MacKay and Sweetman. Sweetman will supply you with badge and authority.

"Report any fire found, giving date, time of day, location, extent and cause if possible. Give these data to MacKay and at end of season send me a report of all such fires----"

During the course of the summer the fire guard discovered and put out two camp fires left burning by Cheekye people on August 22, 1924, at Lake Alice, approximately one mile east of the plot.

IV Inspection of Planted White Pines
for Evidence of Blister Rust

The planted pines were carefully inspected in May, 1924, but no positive signs of blister rust were found. A few possible needle infections were noted to be studied later with reference to any positive signs of blister rust that might develop.

On October 18 and October 25, 1924, the planted pines were again carefully inspected for signs of blister rust, the results of which are shown in Table 58.

The blister rust infection found on a planted pine consisted in a circular discoloration at the base of a needle or around a needle scar.

The planted pine infections were examined by H.G. Lachmund of the Office of Forest Pathology and pronounced to be caused by blister rust.

"Report any fire found, giving date, time of day, location, extent and cause if possible. Give these data to Mackay and at end of season send me a report of all such fires----"

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The planted pine infections were examined by H.G. Lachmund of the Office of Forest Pathology and pronounced to be caused by blister rust.

TABLE LVIII

Planted Pine Infection October, 1924

October 25 N Radius		October 25 NE Radius		October 25 E Radius		October 18 SE Radius		October 18 S Radius		October 18 SW Radius		October 25 W Radius		October 25 NW Radius	
No. Pine	Distance from Circum. (Feet)	No. Pine	Distance from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)	No. Pine	Dist. from Circum. (Feet)
1R	0	(8C)	48	21C	125	52C	304	87L	578	178C	1220	62C	383	24R	150
		(56C)	345	27R	161	114L	676	98R	657			74C	469		
		205C	1237	30C	179	119L	706					97L	634		
				33R	197							143C	938		
				50L	299										
				67C	401										
				70L	419										
				80L	479										
				94R	563										
				(109C)	659										
				176C	1067										
				*(179C)	1085										
				*185R	1121										
1		3		13		3		2		1		4		1	

TABLE LIX
Nearest Known Ribes to Infected Planted White Pines

Radius	Planted Pine Number	Distance and Direction from Infected Pine to Nearest Known Ribes (Feet)	Nearest Ribes: Species	No	Ave. Ht. (Ft)	Total F.L.S.	0 to 100 Feet: Locations: Number	0 to 100 Feet: F.L.S.	100 to 200 Feet: Locations: Number	100 to 200 Feet: F.L.S.	200 to 300 Feet: Locations: Number	200 to 300 Feet: F.L.S.	Total Ribes within 300 feet from Infected Pines: Total Locations	Total F.L.S.
North	1R	Not more than 100 N	Circumference				1	.3	1	.3	--	--	2	.6
N.E.	8C	Not More than 100 N.E.	Circumference				Circumference		1	6.0	1	1.7	2	7.7
	56C	90 S	R. sang.	1	3.5	7.0	1	7.0	3	11.5	--	--	4	18.5
	205C	210 S.E.	R. lac.	1	1.0	1.7	--	--	--	--	1	1.7	1	1.7
East	21C	80 E	R. sang.	3	.27	2.3	2	3.5	3	2.5	2	1.8	7	7.8
	27R	110 S.E.	R. sang.	3	.27	2.3	--	--	5	6.0	3	2.8	8	8.8
	30C	123 S.E.	R. sang.	3	.27	2.3	--	--	5	6.0	2	1.8	7	7.8
		140 (S	R. sang	1	.4	.4								
	33R	(S.E.	R. sang	3	.27	2.3	--	--	5	6.0	3	2.8	8	8.8
	50L	125 S.	R. sang.	1	.4	.4	--	--	1	.4	5	5.9	6	6.3
	67C	190 S.E.	R. sang.	1	.4	.4	--	--	1	.4	--	--	1	.4
	70L	203 S.E.	R. sang.	1	.4	.4	--	--	--	--	1	.4	1	.4
	80L	255 S.E.	R. sang.	1	.4	.4	--	--	--	--	1	.4	1	.4
	94R	354 E.	R. sang.	1	.4	.4	--	--	--	--	--	--	--	--
	109C	424 E.	R. sang.	1	.4	.4	--	--	--	--	--	--	--	--
	176C	144 S.	R. lac.	1	1.0	1.7	--	--	1	1.7	--	--	1	1.7
	179C	140 S.	R. lac.	1	1.0	1.7	--	--	1	1.7	--	--	1	1.7
	185R	148 S.	R. lac.	1	1.0	1.7	--	--	1	1.7	--	--	1	1.7
S.E.	52C	195 N.	R. sang.	11	.4	6.6	--	--	1	6.6	4	7.6	5	14.2
	114L	35 N.E.	R. sang.	1	1.0	1.9	1	1.9	--	--	--	--	1	1.9
	119L	49 E.	R. sang.	1	1.0	1.9	1	1.9	--	--	--	--	1	1.9
South	87L	224 S.	R. sang.	1	.4	.4	--	--	--	--	1	.4	1	.4
	98R	292 S.	R. sang.	1	.4	.4	--	--	--	--	1	.4	1	.4
S.W.	178C	213 S.E.	R. lac.	1	1.0	1.7	--	--	--	--	1	1.7	1	1.7
West	62C	225 N.E.	R. sang.	8	.35	4.7	--	--	--	--	2	6.7	2	6.7
	74C	201 N.	R. sang.	8	.35	4.7	--	--	--	--	3	7.3	3	7.3
	97L	113 N.E.	R. sang.	1	.6	.6	--	--	1	.6	1	4.7	2	5.3
	143C	213 W.	R. sang.	1	.6	.6	--	--	--	--	2	1.6	2	1.6
N.W.	24R	150 N.W.	Circumference				--	--	Circumference		--	--	Circumference	

An examination of Table 59 shows the following facts:

1. The shortest distance from infected planted pine to the nearest known Ribes was found to be 35 feet on the south east radius.

2. The greatest distance from infected planted pine to the nearest known Ribes on the plot was found to be 424 feet on the east radius.

In order to bring out certain points in Table 59, Tables 60 and 61 have been made.

Table 60 shows the directions from infected planted white pines to the nearest known Ribes on or off the plot.

TABLE LX
Analysis of Directions from Infected Planted Pines to Circumference or Nearest Ribes on Plot.

Radius	No. Planted Pines Infected	Directions from Infected Pines to Nearest Ribes: N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
North	1	1	--	--	--	--	--	--	--
N.E.	3	--	1	--	1	1	--	--	--
East	13	--	--	3	6	5	--	--	--
S.E.	3	1	1	1	--	--	--	--	--
South	2	--	--	--	--	2	--	--	--
S.W.	1	--	--	--	1	--	--	--	--
West	4	1	2	--	--	--	--	1	--
N.W.	1	--	--	--	--	--	--	--	1
Total	28	3	4	4	8	8	--	1	1

An examination of Table 60 shows that in over 82% of the cases, the nearest source of white pine infections from the circumference or Ribes on the plot was from the north east, east, south east, and south, or from a general easterly direction, compared with less than 18% from a general westerly direction.

Table 61 gives an analysis of the different distances from known Ribes in which infection of white pines occured.

An examination of Table 59 shows the following facts:

1. The shortest distance from infected planted pine to the nearest known Ribes was found to be 35 feet on the south east radius.

2. The greatest distance from infected planted pine to the nearest known Ribes on the plot was found to be 424 feet on the east radius.

In order to bring out certain points in Table 59, Tables 60 and 61 have been made.

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Analysis of Directions from Infected Planted Pines to Circumference or Nearest Ribes on Plot.

Radius	No. Planted Pines Infected	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
		Directions from Infected Pines to Nearest Ribes							
North	1	1	—	—	—	—	—	—	—
N.E.	3	—	1	—	1	1	—	—	—
East	13	—	—	3	6	5	—	—	—
S.E.	3	1	1	1	—	—	—	—	—
South	2	—	—	—	—	2	—	—	—
S.W.	1	—	—	—	1	—	—	—	—
West	4	1	2	—	—	—	—	1	—
N.W.	1	—	—	—	—	—	—	—	1
Total	28	3	4	4	8	8	—	1	1

An examination of Table 60 shows that in over 82% of the cases, the nearest source of white pine infections from the circumference or Ribes on the plot was from the north east, east, south east, and south, or from a general easterly direction, compared with less than 18% from a general westerly direction.

Table 61 gives an analysis of the different distances from known Ribes in which infection of white pines occured.

TABLE LXI

Number of Cases in which Nearest Known Ribes Were Found Within Given Distances from Infected Planted White Pines.

Radius	Number Pines Infected	Number of Cases in Which Known Ribes Were Found within Different Distances from Infected White Pines. 50	100	150	200	250	300	350	400	450	Average Distance (Feet)
North	1	—	1	—	—	—	—	—	—	——	100
N.E.	3	—	2	—	—	1	—	—	—	——	100
East	13	—	1	6	1	1	1	—	1	1	187
S.E.	3	2	—	—	1	—	—	—	—	——	93
South	2	—	—	—	—	1	1	—	—	——	258
S.W.	1	—	—	—	—	1	—	—	—	——	213
West	4	—	—	1	—	3	—	—	—	——	188
N.W.	1	—	—	1	—	—	—	—	—	——	150
Total	28	2	4	8	2	7	2	—	1	1	169

An examination of Table 61 shows the following conditions.

1. The greatest number of pine infections occurred within 100 to 150 feet from known Ribes.

2. The greatest average distance from infected white pines to known Ribes was on the south radius.

Table 62 shows the number and feet of live stem of nearest Ribes to which pines on each radius were exposed.

TABLE LXII

Ribes Affecting Each Radius

Radius Affected	45° Segment of Circular Area Bisected by Rad.	Ribes on Segment of Plot No.	F.L.S.	Ribes outside Circumference in Band 1 Ch. Wide No.	F.L.S.	Total Ribes No.	F.L.S.	No. Planted Pines Infected on Radius.
North	N22°W to N23°E.	15	15.0	40	846	55	861.0	1
N.E.	N23°E to N68°E	7	26.2	100	1759	106	1785.2	3
East	N68 E to S67°E	12	8.8	421	2330	433	2338.8	13
S.E.	S67°E to S22°E	30	19.4	8	138	38	157.4	3
South	S22°E to S23°W	3	14.2	10	218	13	232.2	2
S.W.	S23°W to S68°W	1	1.0	2	16	3	17.0	1
West	S68°W to N67°W	15	17.4	20	455	35	472.4	4
N.W.	N67 W to N22°W	—	——	8	242	8	242.0	1
Total		83	102.0	609	6004	688	6106.0	28

TABLE LXI

Number of Cases in which Nearest Known Ribes Were Found Within Given Distances from Infected Planted White Pines.

Radius	Number Pines Infected	Number of Cases in Which Known Ribes Were Found within Different Distances from Infected White Pines: 50	100	150	200	250	300	350	400	450	Average Distance (Feet)
North	1	—	1	—	—	—	—	—	—	——	100
N.E.	3	—	2	—	—	1	—	—	—	——	100
East	13	—	1	6	1	1	1	—	1	1	187
S.E.	3	2	—	—	1	—	—	—	—	——	93
South	2	—	—	—	—	1	1	—	—	——	258
S.W.	1	—	—	—	—	1	—	—	—	——	213
West	4	—	—	1	—	3	—	—	—	——	188
N.W.	1	—	—	1	—	—	—	—	—	——	150
Total	28	2	4	8	2	7	2	—	1	1	169

An examination of Table 61 shows the following conditions.

1. The greatest number of pine infections occurred within 100 to 150 feet from known Ribes.

2. The greatest average distance from infected white pines to known Ribes was on the south radius.

Table 62 shows the number and feet of live stem of nearest Ribes to which pines on each radius were exposed.

TABLE LXII

Ribes Affecting Each Radius

Radius Affected	45° Segment of Circular Area Bisected by Rad	Ribes on Segment of Plot: No.	F.L.S.	Ribes outside Circumference in Band 1 Ch. Wide: No.	F.L.S.	Total Ribes: No.	F.L.S.	No. Planted Pines Infected on Radius.
North	N22°W to N23°E.	15	15.0	40	846	55	861.0	1
N.E.	N23°E to N68°E	7	26.2	100	1759	106	1785.2	3
East	N68 E to S67°E	12	8.8	421	2330	433	2338.8	13
S.E.	S67°E to S22°E	30	19.4	8	138	38	157.4	3
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West	S68°W to N67°W	15	17.4	20	455	35	472.4	4
N.W.	N67 W to N22°W	--	——	8	242	8	242.0	1
Total		83	102.0	609	6004	688	6106.0	28

An examination of Table 62 and Map of Cheekye shows the following conditions:

1. The radius affected by the gretest number of Ribes around the circumference, the east radius, had the largest number of pines infected.

2. There were only 8.8 feet of live stem in the immediate vicinity of the east radius on the plot.

3. The above two statements would indicate that the Ribes on the circumference east of the east radius were largely responsible for the infection on the east radius.

4. The radii showing the least number of pine infections, the north, south west, and north west radii, had a relatively small amount of Ribes close to them. While there is 861 feet of live stem affecting the north readius, a glance at the map will show that the largest number of these Ribes occurred in the extreme north east corner of the segment.

5. Altho there was only a relatively small amount of Ribes, 157 feet live stem, associated with the south east radius, there were three pine infections. However, two were very probably caused by 1 R. sanguineum bush within 50 feet.

6. There is insufficient evidence on the number and location of Ribes surrounding the plot to warrant any definite conclusions as to the source of the planted pine infection.

Unknown Injury to Planted Pines

During the inspection of the planted pines for blister rust on Oct. 18 and 25, 1924, a peculiar injury was noted. This consisted in a distinct swelling from on to two inches in length just above the ground. Below the swelling was a construction of the same length. Samples of this injury were sent to the Office of Forest Pathology, where they were determined to be of physiological origin and not caused by blister rust. 90% of the trees so affected were dying.

Table 63 shows the number of planted pines on each radius affected by the unknown injury.

TABLE LXIII
Planted Pines Affected with Unknown Injury

Radius	66 Number of Pines Planted		
	1923	1924	Total
North	1	--	1
North East	16	--	16
East	5	--	5
South East	5	--	5
South	4	1	5
South West	4	1	5
West	9	1	10
North West	--	--	--
Total	44	3	47

Two trees planted in 1923 on the west radius showed the unknown injury and also blister rust.

It appears from Table 63 that the trees planted in 1923 were most subject to the physiological injury.

V Analysis of Infection of Native Pines on the Plot.

In the fall of 1924 a study of the infections on the native pines was begun. Each pine was plotted, given a number, and tagged with that number. Each canker found was tagged. Data were taken according to the forms "Cheekye Plot" No. 1 and No. 2.

The purpose of this work was to put the native pines on the same basis as the planted pines, so that in future years infections on both planted and native pines could be studied and compared.

This work was not completed in the fall of 1924, and a further discussion of it will not be made in this report.

VI Topographic Survey of Cheekye Region

A topographic survey of the Cheekye region, using a Forest Service compass, slope chain, and Abney hand level, was begun in the fall of 1924. Strips were run every 10 chains and topography sketched in using a 10 foot contour interval. This work is not yet completed.

TABLE LXIII

Planted Pines Affected with Unknown Injury

Radius	: 66 :	Number of Pines Planted		
	:	1923	1924	Total
North	:	1	—	1
North East	:	16	—	16
East	:	5	—	5
South East	:	5	—	5
South	:	4	1	5
South West	:	4	1	5
West	:	9	1	10
North West	:	—	—	—
Total	:	44	3	47

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CHEEKYE PLOT #1

Octant ____________ Strip __________ Date ___________ Recorder ________________

Transect No.	Pine No.	Ht.	Heal-thy	Infected					
				Dead	Alive				
					Discoloration	Fresh Pycnia	Pycnial Scars	Fruit in Canker	Canker Dead

CHEEKYE PLOT #2

Octant ______________ Strip ______________ Date ____________ Recorder ______________________

Transect No.

Transect No.

Transect No.

Transect No.

Transect No.

Transect No.

EXPENDITURES

WESTERN OFFICE OF BLISTER RUST CONTROL

January 1, 1924 to June 30, 1924.

Project	Salaries	Subsistence and Travel	Transportation Requests	Automobile, Personal	Automobile, Rented: Rental	Automobile, Rented: Operation	Supplies, Etc.	Total
1. Scientific investigations of the disease,	$ 574.00	$ 286.39	$ 6.66	$ 30.31				$ 897.36
2. Location and eradication of cultivated black currants, nursery inspection, scouting for the disease, and educational work.								
Montana,	831.67	189.24	55.49		$ 151.61	$ 44.31	$ 6.35	1,278.67
Idaho,		108.19	202.48				5.75	316.42
Washington,	440.00	222.11	1.67	181.44				845.22
Oregon,	1,246.00	382.10	33.50	175.98			34.00	1,871.58
Miscellaneous,	2,712.96	169.40	133.55	132.16				3,148.07
3. Control reconnaissance and experimental local control, in the white pine forests of northeastern Washington, northern Idaho, and northwestern Montana,	3,743.50	722.73	167.25	18.41			78.40	4,730.29
4. Inspection of nursery shipments for violations of blister rust quarantines in cooperation with Federal Horticultural Board	1,795.00	990.90	355.02					3,140.92
5. Maintenance and miscellaneous expenses of western field office	1,620.80						611.03	2,231.83
6. Supervision	1,500.00	143.64	458.31					2,101.95
Total	$14,463.93	$ 3,214.70	$ 1,413.93	$ 538.30	$ 151.61	$ 44.31	$ 735.53	$20,562.31

EXPENDITURES
WESTERN OFFICE OF BLISTER RUST CONTROL
July 1, 1924 to December 31, 1924.

Project	Salaries	Subsistence and Travel	Transportation Requests	Automobile Personal	Automobile, Rented		Supplies, Etc.	Total
					Rental	Operation		
1.1 Cultivated black currant location and eradication in cooperation with states.								
1.11 Montana	$ 2,131.67	$ 1,156.41	$ 32.64	$ 432.76	$ 350.00	$ 146.86		$ 4,250.34
1.12 Idaho	1,381.00	1,157.29	34.50		322.15	299.85		3,194.79
1.13 Washington	1,855.16	1,538.55	17.77	751.52	200.00	100.51		4,463.51
1.14 Oregon	2,520.44	2,017.86	272.96	1,235.22				6,046.48
1.15 California	1,560.67	1,063.64	251.79	313.92	322.15	103.37	$ 2.10	3,617.64
1.2 Inspection of transported host plants, in cooperation with Federal Horticultural Bd.	1,888.49	835.71	37.26	21.00				2,782.46
1.3 Sanitation of nurseries.								
1.34 Oregon	433.34	25.00						458.34
1.9 Public information and cooperation in delaying spread	666.67	90.23	47.56					804.46
2.1 Testing and improving methods of control reconnaissance	225.00	177.50					39.95	442.45
2.2 Testing and improving physical destruction of Ribes	2,931.17	1,608.71	1.90	56.84			185.68	4,784.30
2.3 Testing and improving chemical destruction of Ribes	1,008.67	282.75	42.32	250.32			118.96	1,703.02
2.4 Ecological study of factors effecting local control	731.33	591.15					69.62	1,392.10
2.9 Summarizing and making results available	741.67							741.67
3.1 Control reconnaissance on Federal lands.								
3.12 Idaho	1,340.00	839.75					79.35	2,259.10
3.2 Eradication of Ribes on Federal lands.								
3.22 Idaho	11,512.50	5,061.44	99.50	55.44			1,169.08	17,897.96
3.3 Control reconnaissance on private lands.								
3.32 Idaho	1,177.33	11.80						1,189.13
3.9 Public information, demonstration, and service work.								
3.92 Idaho	2,962.05	689.69	15.15	104.30			11.58	3,782.77
3.93 Washington	440.00	138.30						578.30
4.1 Progressive spread of rust.								
4.11 Montana	308.33	152.95		21.56	100.00	46.14		628.98
4.13 Washington	671.22	540.04	9.57	225.33	23.71	20.15		1,490.02
4.16 British Columbia	309.99	319.91	7.21	126.49	176.43	60.11		1,000.14
4.2 Damage caused to pines	1,258.17	590.60	183.02					2,031.79
9.1 Supervision	1,800.00	176.39	395.89					2,372.28
9.2 Maintenance of field office	1,951.00	47.31	214.08				521.54	2,733.93
9.3 Miscellaneous supplies		75.39					132.53	207.92
Total	$41,805.87	$19,188.37	$1,663.12	$3,594.70	$1,494.44	$776.99	$2,330.39	$70,853.88